The Northwestern MILLER
MILLING PRODUCTION SECTION

The Size and Shape of Things to Come In Tomorrow's Milling Industry

By Paul L. Dittemore
Northwestern Miller Editorial Staff

In years past, the flour milling industry frequently was the target of a glib, catchy (and scornful) criticism: "It's in a rut. It hasn't made any technological progress in the past 50 years." The milepost from which those 50 years were counted probably was somewhere in the 1880's, a period when the flour milling industry's three basic machines—the roller mill, the plansifter and the purifier—were firmly established.

If, by "progress," the critics meant that the technologists had not come up with new methods and machines to replace the roller mill, sifter and purifier, they were on solid ground. Their criticisms were silenced, or at least softened, when it was pointed out that neither had anything better been developed in other industries to replace the wheel, the lever, the natural action of gravity and lot of other basic mechanical devices or phenomena.

Occasionally one may find a critic not too familiar with the progress that has been made in the milling industry. That critic may parrot the "no progress in the past 50 years" line as an invitation to conversation. What they really should do, to gain full benefit of the use of exaggeration for the sake of emphasis, is to up-date the libel so that it would read: ". . . in the past 70 years," for it now has been more than 70 years since the introduction of the basic machines which the milling industry continues to "make little specks out of big chunks."

Progress in technology in the milling industry during those past 70 years cannot be measured in terms of technique employed, to the exclusion of the improvement in the quality of the product and the cost of production in terms of man-hours spent per unit of product. If those two factors or "yardsticks" are used, it will have to be agreed that the milling industry has come a long, long way.

A comparative study of production records then and now would yield some interesting information and would serve to pin-point the cumulative effect on quality of product and unit cost of production. For down through the past 70 years the miller has not been content to settle for the philosophy expressed in the song title, "If it's good enough for father, it's good enough for me." That philosophy might apply satisfactorily to one's political leanings or to his religion, but the miller has been a combination of a congenital tinkerer and experimenter in his constant search to do things just a little bit better than his father did them.

Many Improvements

The results of his tinkering and experimenting are manifold. A search through patent records attests to the hundreds of improvements which have been made on the miller's basic triangle—roller mill, purifier and sifter. All of those improvements have had one common purpose: to improve the product and/or to increase the efficiency of the machine, i.e., to lower the unit cost of production of the product.

Progress in milling technology prior to 1946 was usually the result of the work of machinery manufacturers. If historians of the milling industry in future years set about to fix a date for what might be called a renaissance in milling technology, they undoubtedly will settle on 1946 as that date or year.

In this writer's humble opinion, that is the year in which the Association of Operative Millers "came of age" or "grew up" as a professional organization and a significant number of its members began to apply themselves to some serious, organized and fruitful research projects. The technical or research committee of the AOM set its sights on a goal of intensified research, some of it done in the members' mills, some done by the department of flour milling industry at Kansas State College, some done by firms manufacturing equipment used by the industry, and significantly, some done by firms which heretofore had not regarded the milling industry as a potential customer.

Credit for Progress

Much of the credit for progress that has been made since the 1946 renaissance properly should be given to the milling machinery manufacturers who have, first, worked in complete harmony with the AOM technical committee, and second (and importantly) "picked up the tab" for the out-of-pocket expenses of the research. It has been reported that manufacturers of roller mills, for example, collectively expended approximately $250,000 in redesigning, retooling, etc., to produce mills which would meet the committee's specifications.

Space does not permit a detailed recitation of all of the achievements of the AOM research committee during the past 10 years. While we are bandying that word "research" about, let us pause to give it definition before someone in the audience rises to observe that: "Yes, but not all of that research has paid off." Research never will "pay off" 100% (i.e., not all projects will produce useable machines or techniques) because research must be concerned with finding out "what won't work" as well as "what will work." Research to a researcher is a careful search, a studious inquiry, a critical and exhaustive investigation or experimentation having for its aim the revision of accepted conclusions in the light of newly discovered facts.

The scrap piles of hundreds of organizations are filled with ideas that did not pan out to be practical in their application in the light of then existing practices. Unfortunately, it is those failures (if one could fairly call them failures) that seem to linger in the memories of the critics longer than the successes. It is not necessary, however, to give defense to research as such; the amount spent annually for research in industry in this country is a sizeable figure in the hundreds of millions, and if research did not pay off, we would be 'way back beyond even the buhrstone as far as milling technology is concerned.

Rather than to devote all of our attention to past achievements, let's give a few minutes of time to considering the size and shape of things that well may come to the flour milling industry in the years ahead. It is not essential that we take both feet off the ground and settle back into a comfortable position on Cloud No. 14. There are a number of developments that have been proven feasible, and there are also a number of other things shaping up that could have their effects on the flour milling industry in the coming 20, 10 and even five years.

The probable location of the "mill

(Continued on page 27a)

DITTEMORE SAYS . . .

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● Much of the credit for progress that has been made since the 1946 renaissance properly should be given to the milling machinery manufacturers who have, first, worked in complete harmony with the AOM technical committee, and second, "picked up the tab" for the out-of-pocket expenses of the research.

● Research will never "pay off" 100% because research must be concerned with finding out "what won't work" as well as "what will work."

● The probable location of the "mill of the future" with respect to the location of consumer markets is of equal importance to the mill itself. The federal government's long range super-highway program could have a profound effect on the location of those milling plants.

● The mill of the future . . . will be a pneumatic mill and will employ the impact milling process and air separation or classification to a large extent, if not exclusively.

● Automation is here and any miller who is ready and willing to pay the price can have an automated mill.

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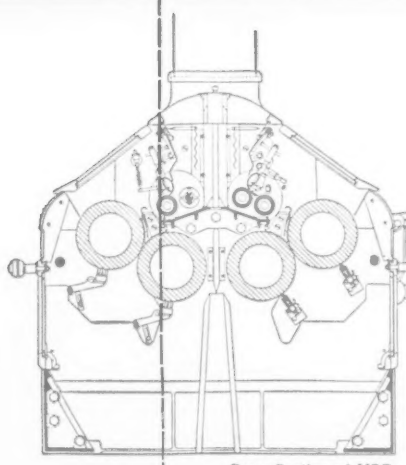

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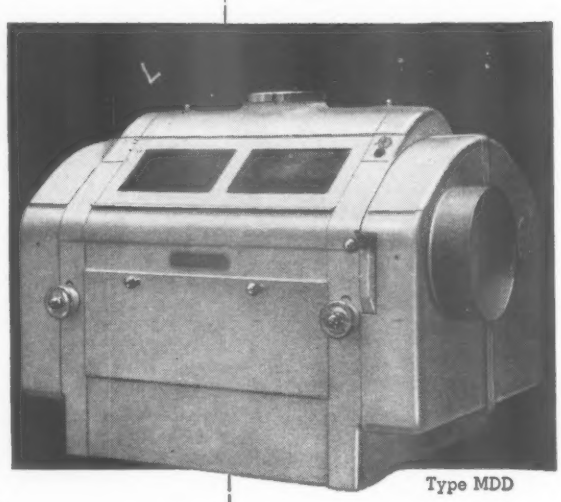

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Program of the 61st Annual

TECHNICAL CONFERENCE and TRADE SHOW

Association of Operative Millers

Sunday, April 28, 1957

1:00 P.M.—Registration, Mezzanine, Statler Hotel

Monday, April 29, 1957

9:00 A.M—Registration, Mezzanine, Statler Hotel.
9:00 A.M.—Executive Committee Meeting, Mezzanine Parlor.
9:00 A.M.—Technical Committee Meeting, Mezzanine Parlor.
12:00 Noon—Wallace & Tiernan, Inc., Complimentary Luncheon, Ballroom.
Call to Order—AOM President, William P. Riley.
National Anthems, USDA and Canada—
Leader, Jack Morris, St. Regis Paper Co.
Invocation.....Rev. William M. Jeschke, Ph.D.
Pastor, St. Luke's Evangelical and Reformed Church
Welcome to Buffalo.....Hon. Steven Pankow, Mayor
Welcome from Mill Management.....G. S. Kennedy
Vice President, General Mills, Inc.
President, Millers National Federation
Response:
Address of President.....William P. Riley
Report of Treasurer.....George S. O. Smith
Report of Secretary.....Donald S. Eber
Report of Committees:
Technical.....Tibor Rozsa
Educational.....Prof. E. P. Farrell
Sanitation.....George B. Wagner
Special Communications.
Appointment of Committees by President.

Monday Evening, April 29, 1957

8:00 P.M.—Annual Allied Trades Party, Ballroom.

Tuesday, April 30, 1957

8:30 A.M.—Meeting Called to Order. Drawing for On-Time Award, Empire Room.
Presiding Officer.....President William P. Riley
"The Story of California Milling Corp.'s New Mill in Los Angeles".....E. A. Stanger, Manager, Henry Simon, Ltd.
"Changes Which Occur Within a Loaded Bulk Flour Car".....D. B. Pratt
Technical Director, Cake Service Section
Pillsbury Mills, Inc.
"Present Status of the Review of Literature on Wheat Conditioning".....Dr. Majel MacMasters
Northern Regional Branch, USDA
"Effect of Year and Station Where Grown on the Relationship Between Thickness of Endosperm Cell Walls and Milling Quality of Four Pacific Northwest Varieties".....
....M. M. MacMasters, R. A. Larkin and I. M. Cull
USDA
"A New Tool for Dry Particle Size Classification"..
.....W. H. Kretz
Manager Classifier Applications Dept.
The Sharples Corp.
"Report on New Haiti Mill, Its Design and Equipment" By Allis-Chalmers Mfg. Co.....
.....William Katz and Herbert Vanderlip
1:30 P.M.—Drawing for On-Time Award, Empire Room.
"WHAT'S NEW???".....Moderator, Tibor Rozsa
"Lap Maker for Leather Belts"....G. Edward Mehleck
Alexander Brothers, Camden, N.J.
"Poly-V Belting".....J. Adams, Jr.
Raybestos-Manhattan, Inc., Rubber Division,
Passaic, N.J.
"Tanastic" No-Stretch Leather Belts.....
.....Kenneth McClelland
J. E. Rhoads & Sons, Wilmington, Del.
"Electra-Gear-Motors, Shaft Mounted".Leonard Morton
Electra Motor Co., Anaheim, Cal.
"Vibro-Switch".....R. M. Stotsenburg
Fielden Instrument Div., Philadelphia, Pa.
"Particle Size Reduction with Entoleter CentriMil, Series 40".....R. J. Hoskins
Safety Industries, Inc., New Haven, Conn.
"Pilot-Venturi Air Velocity Recorder".Douglas D. Decker
Taylor Instrument Companies, Rochester, N.Y.
"Rate of Flow Recorder for Dump Scales"..W. R. Carter
The R. J. S. Carter Co., Minneapolis.
"Car-Flo" Grain Car Unloader....Albert W. Muschoot
Link-Belt Co., Chicago, Ill.
"Pneumatic Flour Handling Equipment"..Fred Warnock
Crissey Co., Kansas City, Mo.
"Permaglas Storage Bins and Fluid-Flow Pneumatic Conveying Systems".....R. E. Shook
Sprout, Waldron & Co., Inc., Muncy, Pa.
"Pneumatics Related to Transportation"....H. S. Sayre
Fuller Co., Catasauqua, Pa.
"New Accessories for the Fluidizer".....W. B. Burnet
Superior Separator Co., Hopkins, Minn.
"Kice Type Vacuum Sweeper".....Jack Kice
Kice Metal Products Co., Wichita, Kansas
"Solids Reclaiming from Wash Water and The Walter Air Classifier".....Ernest Auer
MIAG Northamerica, Minneapolis
"Grain Aeration in Silo Type Bins, and Fog Insecticide Applicators for Box Cars".....J. O. Hibbard
Research Products Co., Kansas City, Mo.

Wednesday, May 1, 1957

8:30 A.M.—Election of Officers, Closed Session, Active members only.
9:00 A.M.—Drawing for On-Time Award, Open Session, Empire Room.
Moderator, Lyle C. Mertz.
"Design and Operation of Reverse Jet-Type Dust Filters".....A. E. Swanson
Vice President in Charge of Engineering,
The Day Sales Co.
"Russia As I Saw It".....Charles Ritz
Chairman of the Board
International Milling Co.
"Brainstorming???".....Dr. Sidney J. Parnes
Director of Creative Education,
University of Buffalo
1:30 P.M.—"Mill Modernization Panel".....
.....Moderator, Jack W. Perkins
Panel Members:
T. C. Mills, Ogilvie Flour Mills Co., Ltd., Montreal, Que.
Albert J. Mayer, Russell-Miller Milling Co., Minneapolis, Minn.
Charles P. Dowd, Robin Hood Flour Mills, Ltd., Canada.
G. A. Hunt, General Mills, Inc., Kansas City, Mo.
Emmett Loy, Loy's Mill, Brookville, Ohio.
L. C. Robinson, Colorado Milling & Elevator Co., Denver, Colo.
Garland King, The Kansas Milling Co., Wichita, Kansas.
Creighton Morrison, Lindsey-Robinson & Co., Inc., Roanoke, Va.
George J. Tesarek, The Quaker Oats Co., St. Joseph, Mo.
Harry L. Donovan, Anaconda Industrial E Agricola de Cerais, Sao Paulo, Brazil

Wednesday Evening, May 1, 1957

7:00 P.M.—Annual Banquet and Entertainment, Ballroom, Statler Hotel.

Thursday, May 2, 1957

8:30 A.M.—Drawing for On-Time Award.
Moderator—Arthur N. Hibbs.
"The Balance of Flour Mills".....Dr. S. A. Herodeck
Assistant Chief Engineer,
Maple Leaf Milling Co., Ltd.
"Hesser-Aernco-Bemis Packaging Machines".....
.....M. Buckman
Milling Engineer, GMI, Buffalo
"Economical Mill Modernization".....F. M. Heide
Vice President, MIAG Northamerica, Inc.
"Current Concepts of Mill Sanitation".Paul McSpadden
Commander-Larabee,
and Member AOM Sanitation Committee
"Comparison of Three Mill Spot Fumigants for the Control of Mill Insects".....Dr. Leah Henderson
USDA Agricultural Marketing Service
Biological Sciences Branch
ADJOURNMENT
12:00 Noon—Tour of Westinghouse Electric Corporation's Buffalo Plant and luncheon at plant.
12:30 P.M.—District Officers and Executive Committeemen's Luncheon. Room will be announced at last session.
2:00 P.M.—Executive Committee Meeting, Secretary's Suite.

LADIES PROGRAM

Tuesday, April 30, 1957

Visit to Niagara Falls. Luncheon at Sheraton-Brock Hotel, invitation of Swiss Silk.

Wednesday, May 1, 1957

Hat and Fur Style Show and Luncheon, Chez Ami, 311 Delaware Ave., Courtesy S. Howes Co., Inc., Silver Creek, N.Y.

Statler Hotel — Exhibit Display on Mezzanine Floor — Buffalo, N.Y.

North American Millers Press Modernization Drive as Key to More Efficiency

By George E. Swarbreck
Northwestern Miller Editorial Staff

Criticized for so long as being out of date, behind the times and archaic, the North American flour milling industry is fighting back. In the past two or three years millions of dollars have been spent by firms, large and small, to acquire the best of equipment—some made in the U.S., some in Europe. Noteworthy is the greater part that American manufacturers are now playing in the modernization business.

Villified by visiting millers from overseas who are appalled at the lack of modern equipment, raked by the fire of the engineers whose job it is to convince the miller that his machinery belongs in the junk yard, and sometimes openly condemned by its own management executives, it is easy to forget that the milling industries of the U.S. and Canada have been making good flour for years.

Since there is no external competition on the domestic market, there is no need to look there for proof of quality and efficiency. Enough evidence is provided by the export trade. American and Canadian flour is still in demand among overseas buyers. Sales in foreign markets recorded by the U.S. millers for the calendar year 1956, assessed at 24,716,000 sacks, were the highest since 1949. Aiding the expansion of business was the

MODERN MILL—Illustrated is the type of building now being erected in Europe to house a flour mill. This one is located in Portugal.

Millers National Federation, an organization currently presided over by Gerald S. Kennedy, General Mills, Inc., who will give the address of welcome on behalf of management to the operative millers at Buffalo. The work done by MNF's Gordon Boals, director of export programs, has paid off. But all the work of Mr. Boals and of MNF would have gone for naught if the operative millers did not possess the knowledge and technique to provide flour at the price and quality desired by purchasers abroad.

So the story of the North American milling industry today is one of rehabilitation and progress. The march to modernization has started. If the present tempo is maintained, the industry will be as efficient as any within a decade.

Not for the North American millers have been the fortunes of war which saw U.S. funds poured into the rehabilitation of the bomb damaged mills of some European countries. The home plants have not been provided with the new machinery and equipment like the millers of Pakistan, by courtesy of the munificent International Cooperation Administration. The money spent, and to be spent, on modernization in North America must come from funds plowed back into the business. The present economic and pricing structure of the milling business makes that a difficult thing to do.

Fortuitous Circumstance

Yet the developments in Europe and elsewhere present one fortuitous circumstance for the North American millers. True, they provided rich pickings for the manufacturers of milling machinery, but this meant that they were enabled to allocate money for development and research. This they had to do in order to meet and beat their competitors. Benefiting from all these progressive ideas and improvements are the North American millers for now that they, too, are on a modernization spree, they can make use of all the better equipment now available.

About two years ago Dr. Betty Sullivan, vice president of the Russell-Miller Milling Co., visited Europe. She gave the answer to the then seeming ascendancy of European firms in the North American market. Dr. Sullivan pointed out that overseas manufacturers had been able to develop improved machinery because the millers in Europe and elsewhere were in a position to spend money on new equipment. American millers, however, did not have such resources, and there was thus no incentive for the U.S. machinery men to expand their activities in the light of modern techniques.

That situation has now changed. U.S. machinery firms are coming more and more into the picture; large orders for construction overseas have been written and the leaders in the business have picked up speed to give the European firms a run for their money in the home market.

The dream of every operative miller is to have a completely new mill in a completely new building. To many it is just a velleity. But one American firm—the California Milling Corp.—did achieve its dream only recently and its new plant will be described at the Buffalo conference of the Association of Operative Millers. There are other instances of complete modernization in the U.S. and Canada, some involving whole new plants.

Remodeling More General

Generally speaking, however, the majority have to content themselves with remodeling their old plants in line with modern thought and practice. Even when such a project is decided upon, invariably management, conscious of the tight money situation, insists that some old machinery must be retained. Roller mills, for instance, go on and on, rarely wearing

(Continued on page 8a)

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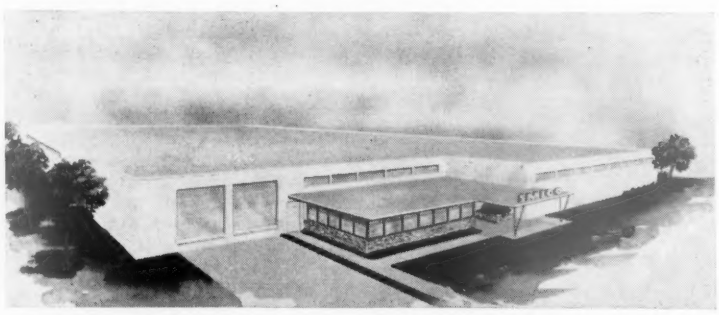

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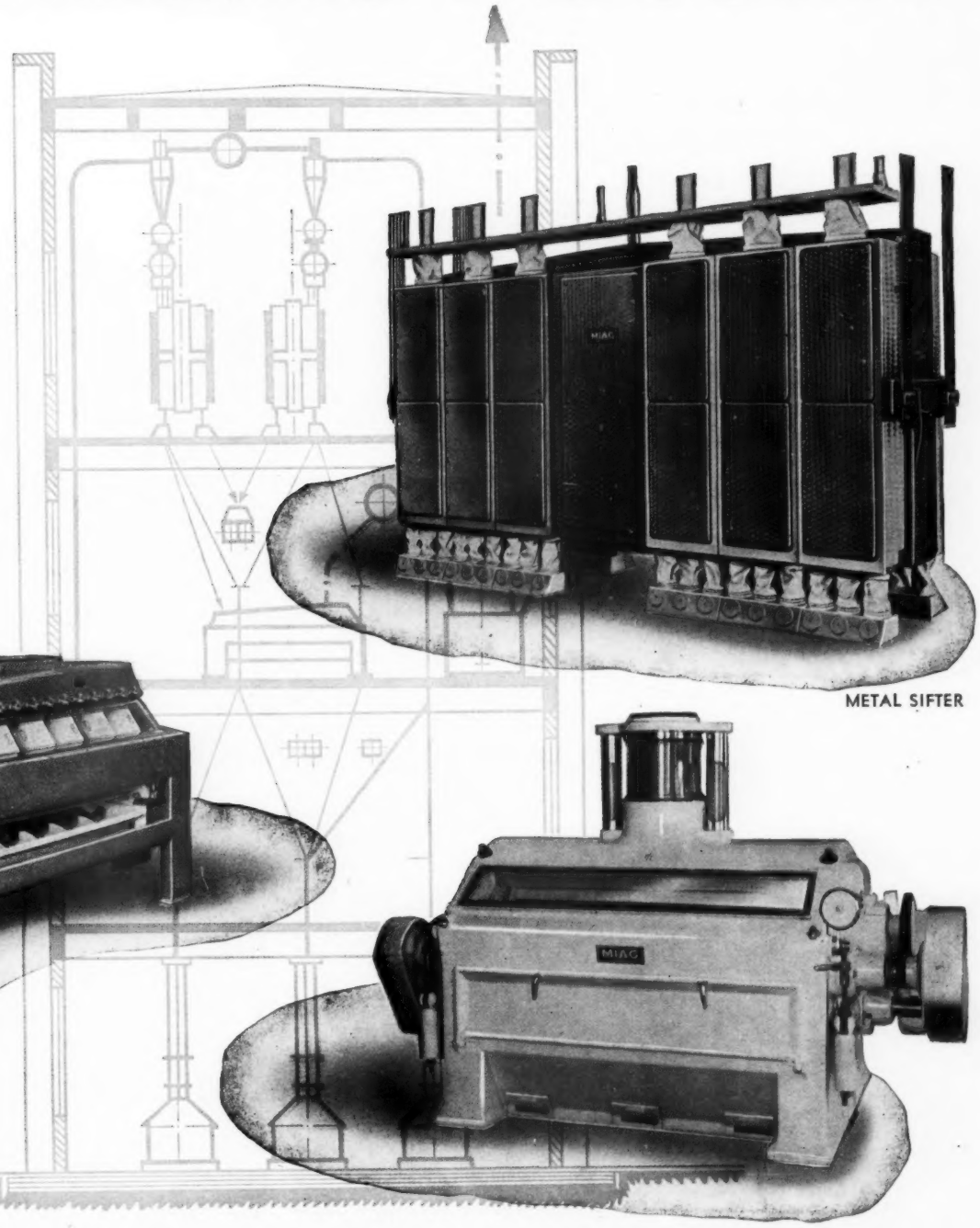
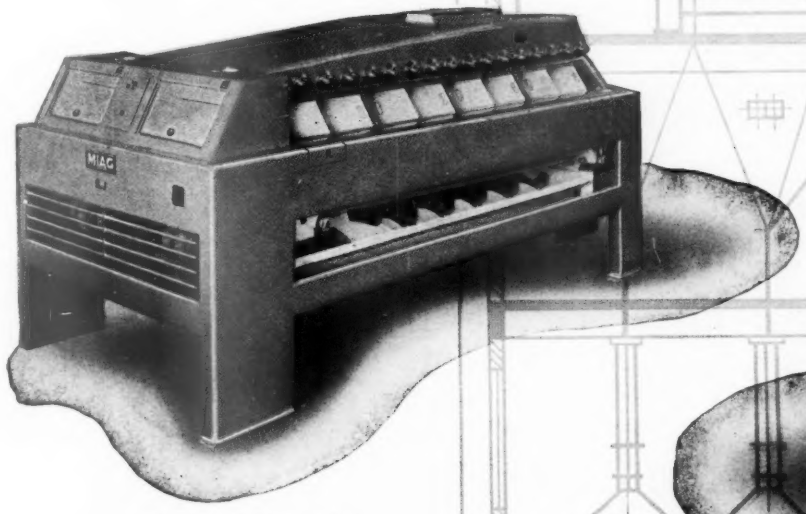


METAL SIFTER



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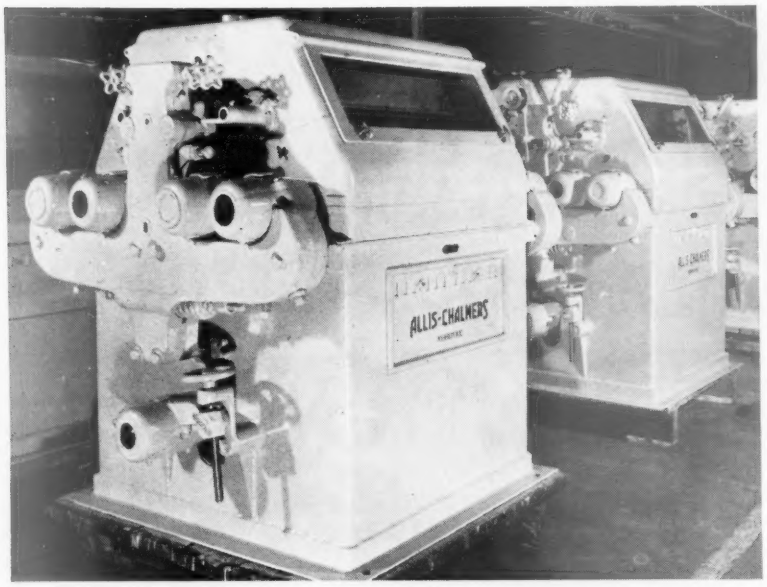
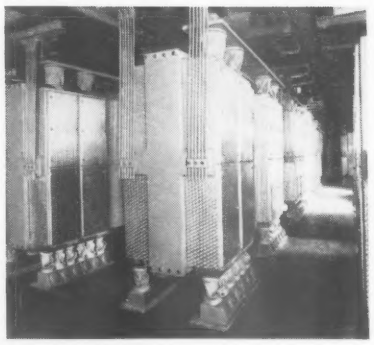
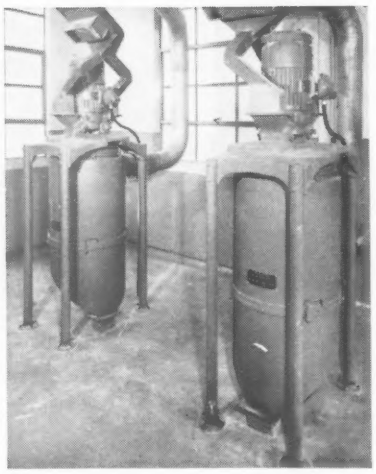


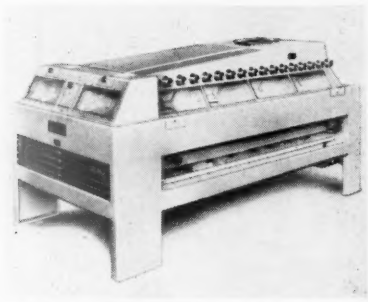
READY TO GO—Roller mills manufactured by Allis-Chalmers Manufacturing Co. await inspection at the factory before shipment to a mill.



ALL METAL SIFTERS — New and modern are these all metal MIAG sifters with withdrawable sieves.

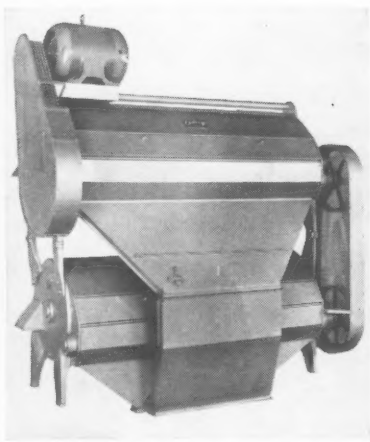


ASPIRATORS — These Entoleter Scourer Aspirators are part of the equipment of a new mill in California.

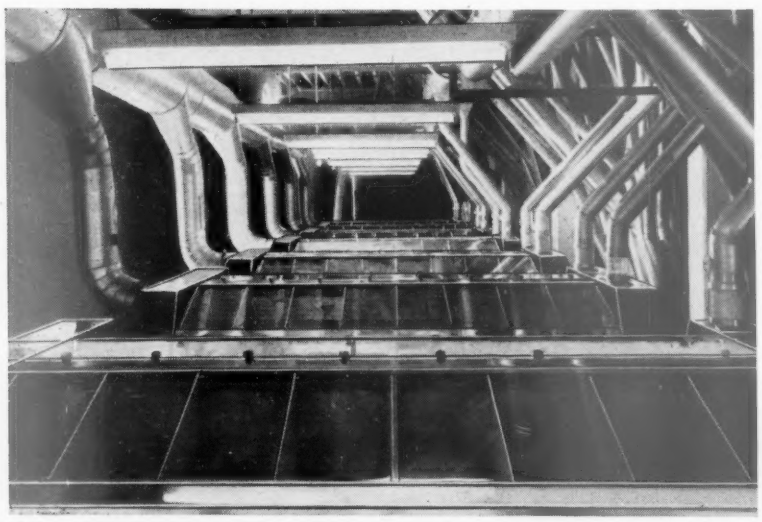


METAL PURIFIER — This is the MIAG all metal double purifier with two sieve layers.

MODERN SIFTERS—Thomas Robinson & Son installed these square-sieve sifters in the new flour mill in Finland.



SEPARATOR—A disc separator by Hart-Carter Co. for length separating and sizing in the wheat cleaning system.



BATTERY OF PURIFIERS — This battery of purifiers, manufactured by Henry Simon, Ltd., was recently installed in a durum mill in Wisconsin.

ROLLER FLOOR—This is the roller floor in a modern two-floor pneumatic mill in Switzerland. The roller mills were manufactured by Buhler Brothers.

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GEORGE E. SWARBRECK

(Continued from page 4a)

out. In some mills are roller mills that were installed at the turn of the century. Carefully maintained, they are as good as they ever were.

One American firm confesses to having to supply spare parts for machines it manufactured and supplied decades ago, a service that has to be provided at less than cost.

The primary aim of the outlay involved is to cut costs, to find better ways of producing flour to sell at a price capable of meeting the ever tightening ring of competition.

Before committing himself to a modernization program, a miller must take into account his current conversion. Will the extra profit justify the outlay? If he decides against making the expenditure, he may have to go out of business eventually for he cannot hope to face up to the compeition provided by the new plants of other millers. Only the modernized mill with its lower operational costs can hope to survive. It's as simple as that.

Bolstering the desire of management to put money into capital costs is the battle for supremacy on the domestic market, or in some small localized segment of that market. As an inefficient unit goes out of production, the battle theoretically becomes easier. In practice, it does not work out that way, for other mills go all out to pick up the business. By no means unregarded is the export field, no longer the lush profit making field of years ago, but still a desirable way of achieving mill run. There the North American miller is up against some spanking new mills, operated at costs way below those incurred on this side of the Atlantic.

There has been some resentment expressed in operative miller circles that the talk—public and private—of the milling engineers tends to disparage the American industry and its efficiency. Says one miller: "There's a lot we can show the Europeans in the fields of instrumentation, automation, packaging, laboratory work and in sanitation."

There is no thought in the minds of the technical representatives that they are belittling the operative millers. Far from it. What they hope to do by speaking of the work done elsewhere, is to show just what is available, how it can be applied in practice and, importantly, how it can be adapted to meet North American conditions.

Gone are the days when the foreign engineers came to North America glowing with enthusiasm about the way things are being done in Europe. They learned speedily that circumstances on the American continent are vastly different from those previously experienced. They modified their approach accordingly.

All these engineers, whether they be German, Swiss or British, and American, too, are fully aware of the great contributions made to milling technology by the operative millers. Their first task is to sell the particular line of equipment they represent; their second, and some of them look upon this facet as being of paramount importance, is to see that the machinery, once installed, does the job claimed for it. They come to tend the plant when needed—and a milling plant is as unpredictable as a woman—or merely to oversee it in operation, an indication of their pride.

Each representative is convinced that his particular brand or system is the best on the market. They avoid comparisons with the equipment of other manufacturers, but operative millers would undoubtedly by surprised at the times representatives are led by the customer into the devious path of making invidious comparisons. If the customers want the story, then they must have it, is the argument.

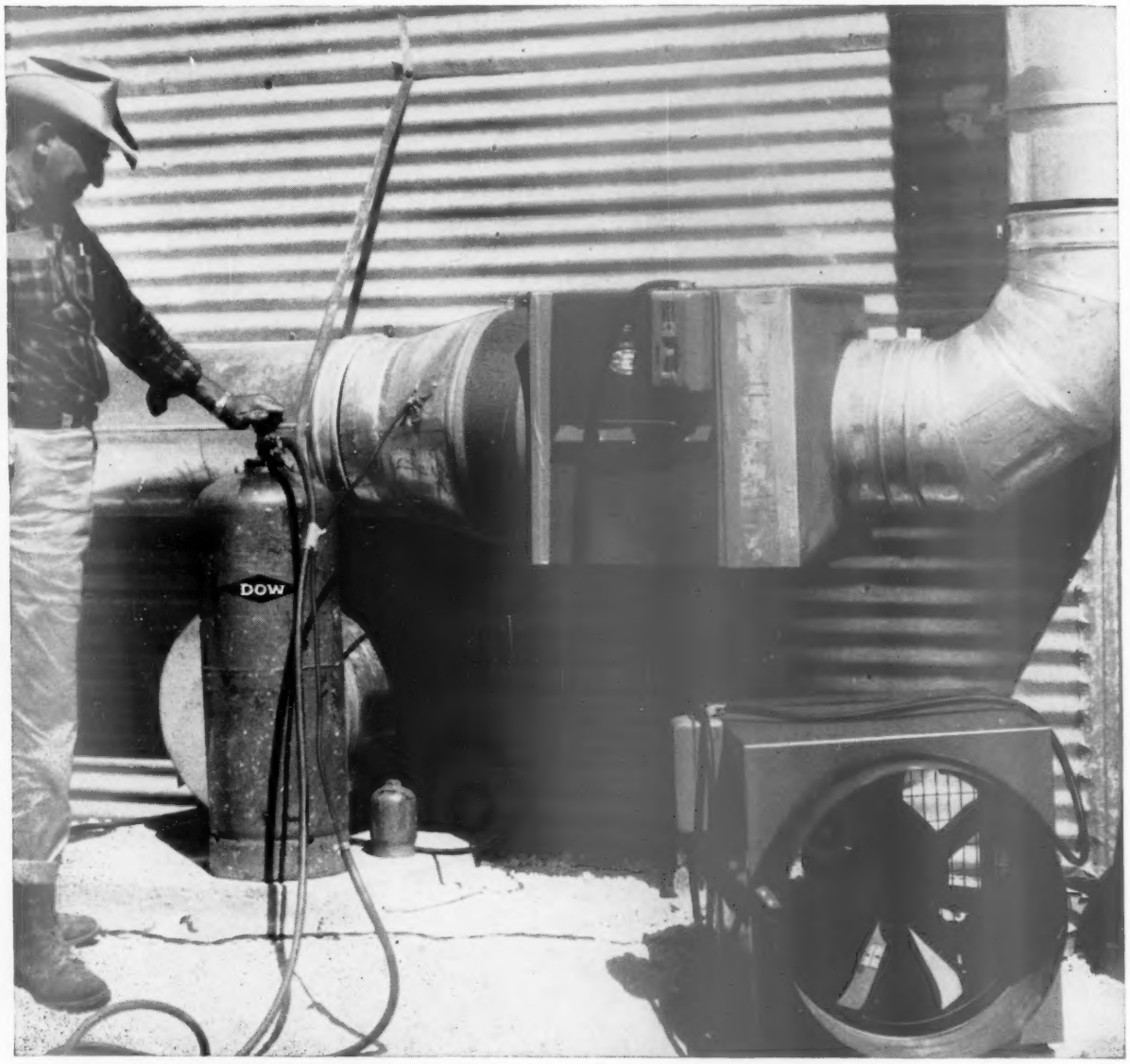
AOM leaders have paid many tributes to the work done by the technical representatives in placing their knowledge at the disposal of the millers in district meetings and in the privacy of the technical committee. They are well deserved tributes. What other industry can call for the advice and help of men who have had experience of their business in all parts of the world and in all sorts of conditions? Very few.

Many North American technologists employed by the mills are quite capable of designing their own plants. Many have done so. But to the medium and small miller, the guidance of some of the world's top milling experts is freely available.

Many of the mill buildings in North America today were designed for capacities far below the volume coming off now. The plants are crowded; working space is at a premium as more and more machines are forced in.

Modernization, it is claimed, can make vast improvements to satisfy management and operative. The one wants more profit for his product; the other desires to provide that product at a standard acceptable to the customer. No one will deny that a good product comes off the production lines right now, but many managerial men will deny that they make a satisfactory profit.

What are the requirements of a



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X-RAY MACHINE — Pictured is General Electric's X-ray unit which provides an improved method for checking insect infestation in grain.

modernization program? Complex plants with elaborate flows are not necessarily the answer. Some millers believe that the milling process has become much too complex for comfort. Yet there are certain fundamentals.

In the majority of cases, it is wellnigh impossible to consider a complete modernization all at once. The work must be done in stages.

It is apparent that many mills urgently need new cleaning plants; that equipment is right on the doorstep for the U.S. has developed some of the best types of modern cleaning equipment. Very few mills are remodelled today without some item of American cleaning equipment. Putting the wheat in the best physical state for milling calls for improved conditioning or tempering. Great strides have been made in this field.

To a management that insists: "We'll get by with the roller mills," the answer lies in an examination of the newly developed machine. It is designed to operate at high speeds—much higher than those in Europe—and comes equipped with automatic devices to control grinding according to the load on the roll. The main grinding rolls separate automatically when the load comes off the roll. No matter how good the old roller mills may look, the installation of new can help the profit picture vigorously.

Wooden purifiers are much improved; some millers now swear by the all-metal variety. The new purifiers are simpler to operate, easier to adjust and are capable of handling high capacities efficiently. Sifters, too, have shared in the progress and are the very essence of engineering skill and design.

Perhaps no progress has been more remarkable than that shown in the field of pneumatic conveying. The system makes for a cleaner building, eliminates some of the sources of infestation, cools the stock for sifting and allows greater room in the mill building. There is much to be claimed for pneumatics. Yet pneumatic conveying is not a must, by any means. Mills are still being built today with conventional conveying. Moreover, it has already been said by an operative miller of considerable experience that an efficient orthodox conveying system does not justify its abolition in favor of pneumatics. But the milling engineers can tell a very convincing story. Certainly, the majority of new mills built around the world in the past 10 or 12 years have pneumatics.

The mill flow in a modernized plant is designed to make better use of the more efficient grinding and purifying equipment installed. The new system is as near automatic as can be for the millers dream of automation. Yet a modern mill is one that can be operated with the minimum of men and the maximum of efficiency.

It is not only in the field of production that modernization has made progress. New packaging methods, new weighing systems and the like are all playing a part in the invigoration of the North American milling industry. The science of electronics has come to the flour milling industry. The X-ray test for insect infestation may be adopted more and more in the future for government experts are said to favor it. To allow for its general adoption, perhaps, the price will have to come way down. Yet the X-ray test is symptomatic of the developments in the milling industry.

Part of this field, too, is instrumentation, with many firms providing equipment that helps make flour milling one of the most progressive industries in North America.

Management, not surprisingly, feels that the term "modernization" is synonymous with the word "money." It is the job of the operative miller to prove that modernization does, indeed, mean money, but he should stress not the money going out to provide the means, but the money coming back as the end.

FUMIGANT FIRM MOVES

CHICAGO—The Industrial Fumigant Co. has moved into new modern warehouse and office facilities at 6514 South Cicero Ave., Chicago 38, Ill. The telephone numbers for the firm in Chicago are Reliance 5-4919 and Globe 8-3905.

——BREAD IS THE STAFF OF LIFE——

ELEVATOR OPERATOR KILLED

NANKIN, OHIO—Charles H. Perry, operator of the Nankin grain elevator, and his sons, Melvin, 8, and Carl, 6, were killed in a car-truck collision near Ashland, Ohio, March 17.

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Processing, Cleaning and Rolling Of Quality Grains

By Melvin E. Thoman

Rolled grains, an important product of the feed industry, are used for feeding animals such as cattle, horses, sheep, etc. Rolled grains are used as straight feeds, are blended with molasses, or are used in the formulation of mixed feeds.

There are two primary reasons for rolling grains: (1)—the farmer demands rolled grains for certain types of feeding because of their better digestibility, enhanced appearance, palatability and the readiness in which they are eaten and turned into profits; and (2)—by the wise selection and purchasing of grains and through the efficient installation and operation of rolling equipment, the feed manufacturer can supply this demand and realize a profit as well. It is assumed, of course, that taken into consideration is the customary price differentials which prevail in the area, the same as in the case of any other specially processed products.

In general, the various phases of the rolling system consist of selecting the grains, and the receiving, binning, cleaning, conditioning, steaming, rolling, cooling, and packing of them. Each phase is important in itself, as a failure in any one of them can nullify the efforts of all the rest and result in an inferior product.

The manner in which the job is accomplished will vary in different mills, depending upon the facilities available, the lay-out, and individual thinking or preference. Pneumatic equipment is efficient, clean and desirable; but bucket elevators and screw conveyors prevail in most feed mills. In any case, the basic phases are much the same, and, if followed faithfully, the results will be quality products.

EDITOR'S NOTE: Mr. Thoman is a member of the staff of Fisher Flouring Mills Co., Seattle, Wash. His paper was part of the program at the third annual feed mill production school organized by the Washington State Feed Assn. at Seattle recently.

Selecting Grains:

In this area the supply available from which to make selections consists mainly of the western varieties. The bulk of the supply which is available and suitable for rolling falls under the No. 2 and No. 3 classifications of the federal grain standards, with the No. 2 grade furnishing about 75% of the grains selected. The No. 1 grades are used mainly for other specialized purposes, but occasionally, through some quirk in their makeup, they are directed to feed channels. These, along with the No. 3 grades, make up the balance of this supply.

Normally, selection is made from spot samples taken from a car of grain, which are representative of the entire car. The person selecting grain from these samples should try to visualize the final product which would be produced in the sack or in the feed, taking into consideration the various processes through which the grain would be put.

These representative samples usually will amount to about 2 or 3 lb. It often is to one's advantage to take a small amount from these samples and hand-pick it before making a decision as to grading the entire carload. The samples referred to are those taken to determine the use of the grain in the mill, and not those taken by the state Department of Agriculture for inspection and grading purposes.

The characteristics of barley best suited for rolling are: well-filled kernels of uniform size, and thin hulls with good color and odor. Be aware of blue barley as it is hard and brittle and will tend to shatter. Also, some barley with long heavy hulls will have a very rugged, thorny appearance when rolled.

Oats should be of the heavy classification, weighing around 38 lb. to the bushel. The kernels should be filled with well developed groats. The size should be uniform, the color bright, and the odor should be good. Be aware of excessive amounts of thin oats as these tend to lower the quality of the product. There are instances, however, when the basic oats are of such good quality that they make extra processing practical. This must be decided by the person grading the sample.

The moisture also should be determined at this point. For best results, as far as the rolling system is concerned, this should be about 11.5%, but most grains come in much lower and, at times, much higher than this. It usually is an inexpensive project to install equipment in the transfer system to add moisture to the desired level; but unless a mill already is equipped with a drying system, it generally is more practical to direct the high moisture grains to grinding.

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the necessary qualifications and through repetition, it is a simple matter for a person to become quite efficient in the selection of the proper grains for rolling.

Receiving, Weighing, Binning:

Grains that are being received into the mill often may contain foreign materials which may choke the stream or harm the equipment. As a matter of protection, the grain being received should be run over a magnet to remove the tramp metal; then through a receiving separator equipped with scalping screens and aspiration—the scalping screens for removing pieces of wood, stones and non-magnetic metals, and aspiration for removing straw, paper, pieces of burlap, etc. The grains then are weighed and transferred to storage bins according to how they have been classified.

Transferring to Bins:

When the grain is being transferred to the cleaning bins, the moistures should be taken into account, as there usually is some point in this operation where it is practical to install a means of conditioning the grains with low moisture content. Adding moisture to the grain at this time will allow it to assimilate steam more readily, thereby requiring less steam, rolling more easily with less horsepower and helping to improve the product in general. A simple spout control, operating a mercury switch, an electrically operated magnetic valve and a source of water supply usually are all that is required for this operation.

Whenever possible the grain should be transferred to the cleaning bins 8 to 12 or more hours before it is to be drawn for cleaning, as this will allow the moisture to penetrate the kernels equally throughout the lot.

Cleaning and Transferring:

The grain may contain amounts of foreign materials, wild oats, broken kernels, etc. The federal grain standard classifications allow a certain amount of such materials; however, it is desirable to remove them in a cleaning process.

There are a number of machines used for cleaning, the most common being the receiving separator. This has oscillating sieves for sieving according to size, and aspiration for removing dust, straw, light seeds and pieces of paper.

There is a wide choice in sizes and shapes of screen perforations used to clean the grains of various sizes and conditions. Table 1 contains a list of commonly used sizes.

Table 1—Screen Sizes and Shapes of Perforations

	Scalp	Sieving	Sand
Barley	5/6 Round	13/64x¾ Elongated	6/64 Equilateral Triangle
Oats	5/6 Round	13/64x¾ Elongated	6/64 Equilateral Triangle
Wheat	34/64 Round	16/64 Round	6/64 Equilateral Triangle
Corn	5/6 Round	20/64* Round	

*Corn over and smaller grains through.

The separator is equipped with balanced feed gates to spread the grain evenly to the aspirating chamber and onto the screens.

The aspirator chambers have adjustable valves for regulating the air flow through the grain. These valves should be adjusted to the point where they are removing all of the light impurities without extracting desirable grain.

The results should be checked frequently as the grain leaves the separator to be transferred to the work bins where it will be available for use in special processed products.

Return spouting from the work bins to the separator system will allow recleaning the grain when necessary and also will provide a means of emptying the work bins as desired.

The Rolling System:

At this point the grain is taken from the work bins through a controlled feeder to the steamer, tempering bin, roll and cooler.

This system should be designed so that, except for the initial starting, adjusting and stopping, it should require no more supervision than the periodic checking and adjusting that the operator gives any of the various systems which he is operating.

The use of a stop and start device operated by a magnetic switch controlled by a bindicator in the tempering bin, and an electrically operated magnetic valve in the steam line controlled by a spout control device ahead of the steamer will help to accomplish this. These may be designed to include centrally located warning devices.

A small grain scale equipped with a hopper and an adjustable feed gate or slide will do an efficient job of regulating the feed. The scale also will provide a means of checking the amount of grain used against production.

As the grain is moved from the feeder to the steamer, it should be passed over a magnet to remove any metal that has been missed or has been picked up in the processing, to prevent harm to the rolling equipment.

The steaming system should provide enough low pressure steam and have a steamer capable of raising the moisture about 3½% to 4%. As an example, barley entering the steamer at 11.5% and at a rate of 5000 lb. an hour, is raised to 15.1%, which means that about 5.2 boiler horsepower of steam has been assimilated as moisture in the barley. This, of course, will be reduced later by the cooler. Ample allowances should be made for variations in the ability of the barley to absorb the steam, the rate per hour, and the efficiency of the steamer. Oats, which assimilate steam more readily, do not present a problem except for an adequate control to regulate the steam.

Table 2—Moisture Check on Barley and Oats

Rate per hours— 5,000 lb.	—Moisture %— Barley	Oats
Grain at scale	11.5	11.4
Rolled grain from roll	15.1	15.6
Rolled grain from cooler..	12.7	12.9

This example indicates that the moisture on the barley has been raised 3.6%, which is equal to 5.2 boiler horsepower. These figures, of course, will vary due to the wide vari-

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OFF TO BUFFALO—Displaying a banner bearing the theme of the 61st annual Technical Conference and Trade Show of the Association of Operative Millers at Buffalo April 29-May 2 are, left to right, J. George Kahr, Russell-Miller Milling Co., Minneapolis; Donald S. Eber, international secretary of AOM, Kansas City; Lyle Mertz, General Mills, Inc., Buffalo; and Roy F. Kehr, Kressilk Products, Inc., Buffalo. The Milling Production cameraman snapped this display of enthusiasm for the conference during the recent meeting of Districts 3 and 6, AOM, at Battle Creek, Mich.

ation and characteristics of the grain being used.

The horizontal conveyor type steamer of adequate diameter to allow the grain to be conveyed slowly through the steam to the tempering bin is commonly used. This should be set at approximately the rate of production. A pressure gauge, adjusting valve and adequate moisture traps should be included in the steamer supply line.

The steamer, steam lines and tempering bin should be well insulated to provide maximum efficiency and to prevent condensation in the surrounding areas.

The tempering bin should be designed to allow at least 30 min. tempering time before the grain is rolled. The bin should be equipped with a bin control to operate the start and stop control on the intake scale. The adjustable feeder will allow the stream to be adjusted to hold these intermittent periods to a minimum.

Aside from the initial starting and the final stopping of the run, this system will function automatically.

Sufficient time should be allowed for the tempering process ahead of the scheduled rolling, and, by the same token, the grain should be shut off in time to empty the system completely at the end of the run. Grain should not be left in the tempering bin for an excessive period of time, as it will become badly discolored.

There are a number of various makes of rolls on the market. However, the general principles are much the same and embody controls for making very fine adjustments and locking devices for holding the adjustments; provided, of course, that the conditions under which adjustments are made remain substantially the same. The roll may be equipped with heavy chilled rolls of 18"x24" or 18"x30" size with Stevens "V" cut corrugations cut 18 to the inch with a 1 in. spiral.

The roll should be supplied from an adjustable feeder which also will distribute the grain evenly over the entire length of the rolls.

In general, when adjusting the rolls, barley will be rolled so that the kernels are flattened to the point where the white shows predominantly through the husk and just short of the point where the flakes will curl. Oats will be flattened just short of the point where the groats will pop out of the hulls. But the manner and amount of handling they will receive before the packing, or whether they are to be used as ingredients for mixing will influence the degree of rolling desired.

Cooling may be accomplished with either vertical or horizontal type coolers. Both have adequate controls for continuous operation. Personal preference and availability of space may decide which type will be used.

The principle of the cooling operation consists of drawing cool air from the room through the hot rolled grain. As the cool air is heated, its relative humidity drops, allowing it to pick up excess moisture and convey it along with the heat away from the stock which is being cooled.

The moisture and temperature may be controlled by the length of time allowed for the cooling process. But, in general, the stock will be discharged from the cooler with about 1¼% to 2% more moisture than it contained before entering the steaming process; and the temperature may be lowered to within 12 to 15° above the temperature of the air being supplied to the cooler.

This example indicates that the cooler has reduced the maximum moisture of the barley 2.4%, which, at a production rate of 5000 lb. an hour, is equal to 120 lb. of water. At 34½ lb. of water per boiler horsepower this means that 3.46 of the 5.2 boiler horsepower of steam that was assimilated by the barley in the steaming process has now been removed by the cooler. For safe storage under most conditions, the moisture at the pack should not be over 14.0%.

Table 3—An Example of Temperature and Moisture Tests on Rolled Barley and Rolled Oats at the Cooler

	—Rolled barley—	
Rate 5,000 lb./hr.	Moisture	Temperature
To cooler	15.1%	188° F.
From cooler	12.7%	86° F.
	—Rolled oats—	
Rate 5,000 lb./hr.	Moisture	Temperature
To cooler	15.6%	171° F.
From cooler	12.9%	84° F.

The rolled grains should be handled as little and as gently as possible during the conveying and packing operations. Vibrating or oscillating type settlers are ideal for packing but auger packers may be used successfully, provided very little brake pressure is used.

Cleaning the roll and cooler after each daily run, and periodic inspection of the controls throughout the system will insure maximum use and trouble-free production.

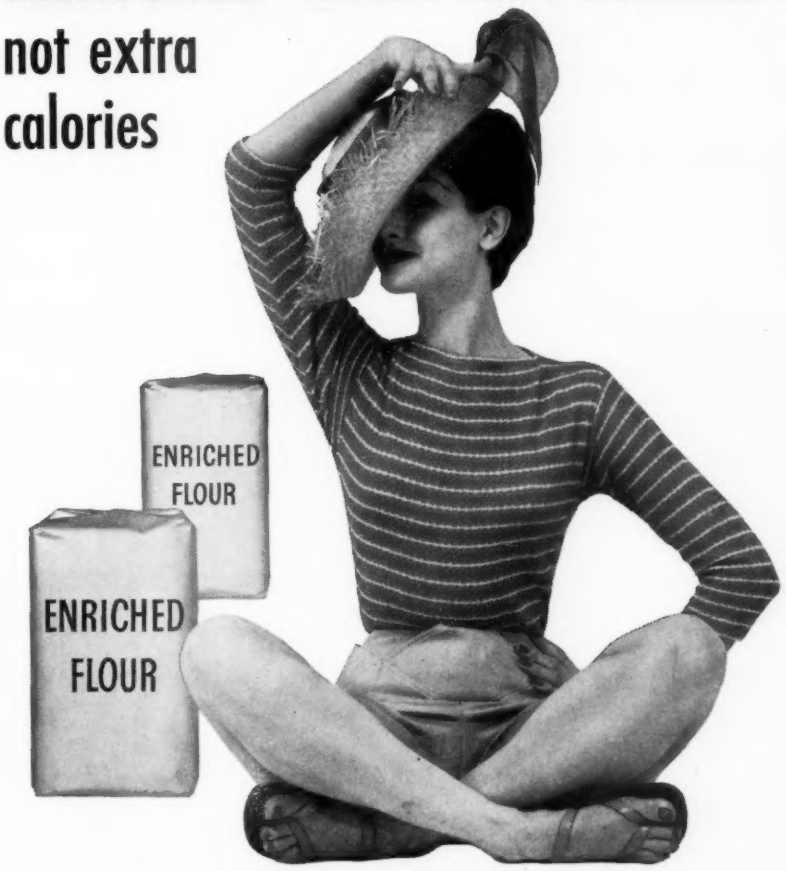
In conclusion by the use of initiative and by making necessary revisions to fit individual situations, it is possible to produce quality rolled products so long as the basic principles are followed.

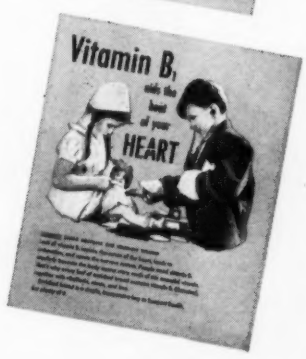
——BREAD IS THE STAFF OF LIFE——

DUST CONTROL SYSTEM

ATCHISON, KANSAS — The Forster Manufacturing Co., Ada, Oklahoma, and Wichita, Kansas, has completed installation of a dust control system for the C. & G. Grain Co., Atchison, Kansas. This system was installed for the new grain elevator built by C. & G. as an addition to its Atchison plant.

"ENRICHED" means extra vitamins... not extra calories





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The story of enrichment can play a powerful part in your consumer promotion. To help you tell this story, sets of five different colorful posters are available from your Merck representative. Or write direct to Rahway, New Jersey for a supply.

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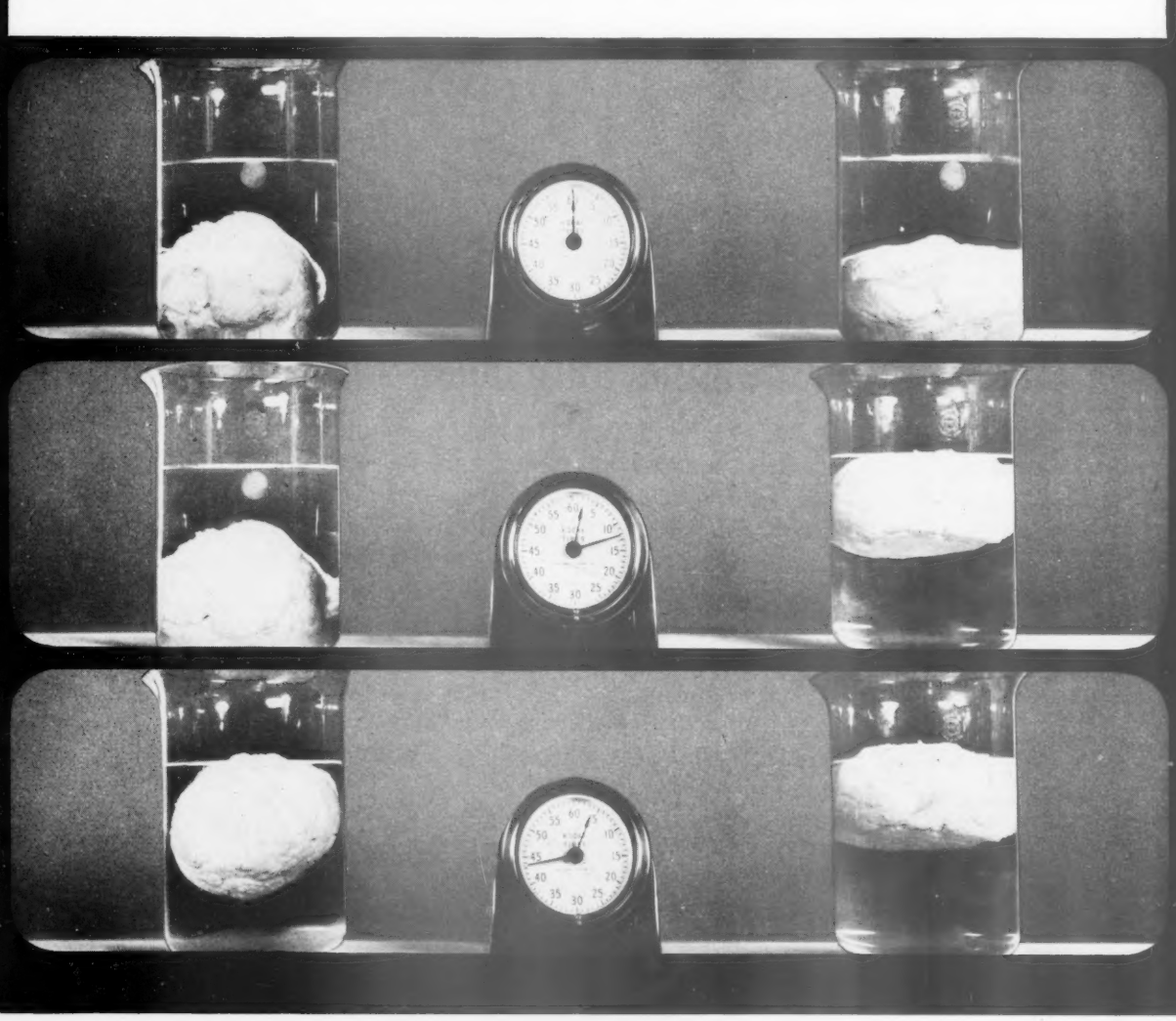
If it's performance you want, try Monsanto's complete line of leavening agents. All of these products can be used in combination with one another. They give superb texture, volume, crust and crumb color. Among them you have a choice selection for every baking need.

SAPP-40, for example, is ideal for prepared mixes . . . SAPP-28, an excellent slow-baking acid . . . HT* Phosphate (MCP monohydrate), spray dried for free flow . . . and, of course, for extra long shelf life and maximum gas release in oven use PY-RAN*, Monsanto's anhydrous monocalcium phosphate.

PY-RAN Helps 3 ways:

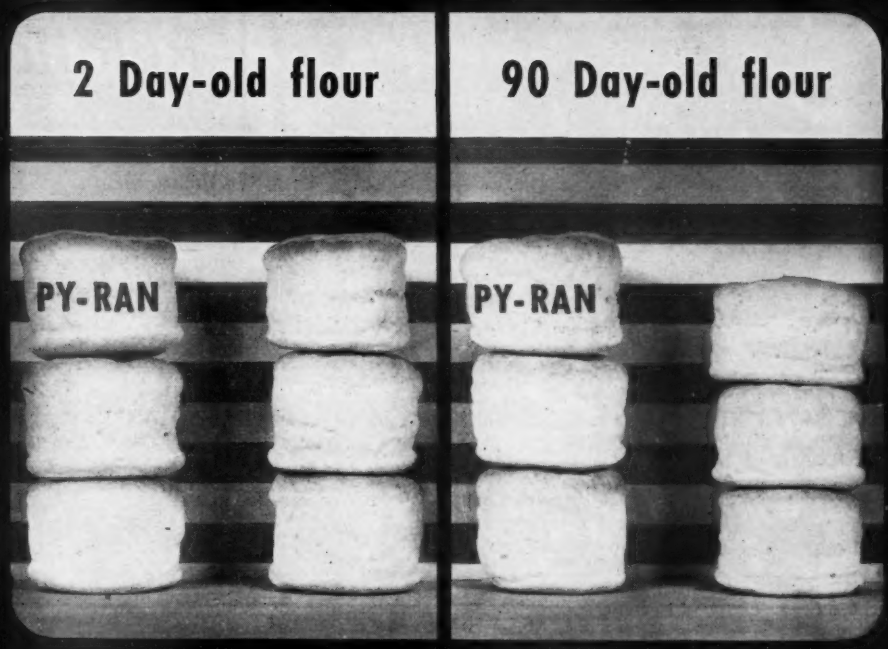
1. Proof PY-RAN Leavens in the Oven

Fresh-mixed doughballs leavened with Py-Ran (left), another calcium phosphate (right). Latter gives off CO_2, floats to top at 2 min. 12 sec. Py-Ran doughball begins rise at 3 min. 44 sec., proof of slow, controlled gas release.



2. Proof PY-RAN Gives Longer Shelf Life

Housewives use your flour 30 to 90 days after you make it. Here flour leavened with Py-Ran and with another calcium phosphate gives equal results when 2 days old. Aged to equal 90 days of shelf life, only the Py-Ran flour performs like new.



3. Get This Bonus with PY-RAN

At left, the circled tenth biscuit symbolizes the extra yield your customer obtains from self-rising flour leavened with Monsanto Py-Ran. At right, nine biscuits represent the limited yield when an ordinary calcium phosphate is used.

and now, still another new Monsanto leavening agent, stabilized dicalcium phosphate

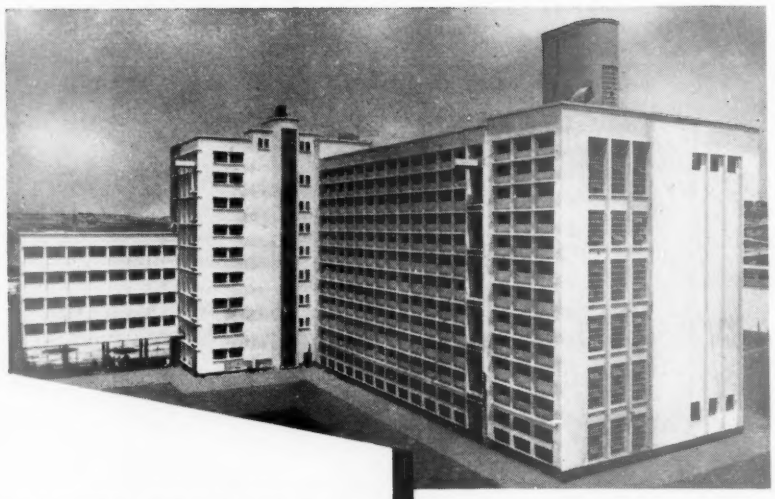
Monsanto's new stabilized dicalcium phosphate, for which patent application has been made, is alkaline. When mixed into cake batter it stays dormant indefinitely in normal storage. Oven temperature—170° or more—turns it acid with resultant normal leavening action. New market possibilities: refrigerated and frozen cake batters; commercial batters and doughs, baked when convenient; longer life dry mixes.

For more information, call your nearest Monsanto Sales Office, or write for your copy of four-page paper, "New Leavening Agent"—it's complete with test photographs, charts and graphs. MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 710 North 12th Blvd., St. Louis 1, Missouri.

*Reg. U. S. Pat. Off.

MONSANTO

Where Creative Chemistry Works Wonders For You



GIVING THE MILLER WHAT HE WANTS

Anaconda Mill, Brazil, one of the finest mills in the world, stands as a model of what can be achieved by wholehearted co-operation.

Starting from Scratch

If you want the best possible mill for your money, let the Robinson engineer in on the ground floor, for co-operation between miller and engineer is the key to success in mill design. Only in this way can the customer get what he wants. Robinsons do not lay down the law to the miller; they study his requirements and follow up that study with positive recommendations.

Robinson OF ROCHDALE

THOMAS ROBINSON & SON LTD., ROCHDALE, ENGLAND

Resident Representative in U. S. A.
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KIPP KELLY LTD., 68 Higgins Avenue, Winnipeg, Manitoba, Telephone: 92-2507

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MILLING WHEAT • COARSE GRAINS • MILLFEED

Hard and Soft Winter Wheat

ST. LOUIS • KANSAS CITY • MINNEAPOLIS

First Choice Wherever Grain is Handled

Your jobber has them, or write B. I. Weller Company, 327 South LaSalle Street, Chicago 4, Illinois.

(1) The logarithmic curve design loads easier . . . dumps cleaner . . . permits high speeds.
(2) Scientifically formed lip aids in greater cup capacity.
(3) Bolt-hole placement gives better cup balance . . . saves belting.
(4) Hyperbolic sideboard ends permit greater load capacity without "slopping."

CALUMET CUPS

Better Employee Relations

By Ola C. Cool
Director, Labor Relations Institute

Discipline Is Education

Workers are much the same on the job in the mill as most people are on the highway. They'll break a rule once in a while because they think it won't do any harm. They may even doubt the value of the rule itself. And in many cases, they completely lose sight of why the rule or regulation was established in the first place.

Too many mill managers have the feeling that discipline is punishment. Actually, discipline is a process of education in which punishment is resorted to as a final measure.

It is also widely believed that disciplining someone who breaks a rule involves only one person. This is very rarely true, because what happens to one man under any given set of circumstances spells out for all the other employees what they may expect under the same conditions.

Laying off Kennedy is not so much a matter of making Kennedy like it, as it is a matter of being so fair about it that the other employees agree that you've done the right thing.

Every case of disciplining comes after some kind of a failure. And failure to discipline, when required, has a demoralizing effect on the group as a whole.

Workers just don't know where they stand when one man is disciplined for an infraction, and another is allowed to get away with a similar infraction.

Plan your handling of each discipline case in advance. Remember, that you are not just disciplining one man, you are disciplining the whole department or perhaps even the whole mill.

What happens to this one individual will be construed by the entire force as an indication of: (1) What constitutes a breach of discipline. (2) Whether you mean what you say. (3) Company attitude towards previous service. (4) Discrimination or impartiality.

Watch Out For the Malcontent

The malcontent is a chronic, unhappy person who not only poisons himself but has a disturbing influence on his fellow employees. The presence of such an individual in your mill may constitute a costly headache.

The mental condition and attitudes of the chronically unhappy employee may stem from either personal or occupational causes. If he is of the introvert type with an inferiority complex derived either from his personal or occupational background, your problems will be different than otherwise.

The person with an inferior feeling will often indicate this by such actions as:.

1. A lack of confidence in his ability to successfully perform an assigned task.
2. He is usually afraid to try out on a new job because he expects to fail.
3. He shows extreme reactions from criticism because he thinks he should always receive praise from his boss.
4. He invariably rationalizes his failures or mistakes and seeks to blame every other person except himself.
5. He seeks to escape unpleasantness by withdrawing into a little world of his own. This phase is often indicated by an almost complete lack of friendly relationships with fellow workers.
6. He is prone to worry as a source of escape from the realities of his job.
7. He often feels that he is not being treated fairly in his job assignments.
8. It is not usual for a worker with a decided inferiority complex to express his inner feelings. In fact, very often what he says has an opposite meaning.

In all such cases, there is a lack of proper adjustment either to the job, the department or the mill.

Offer Advice if Possible

Questioning may bring out the facts regarding his home life and his problems, whether financial or domestic or both. Upon determination that the problems are personal, it is desirable that you offer advice, if you can secure any indication from your worker that he would welcome any expression from you. If he indicates any desire at all for an improvement of his situation, this is your cue to make suggestions.

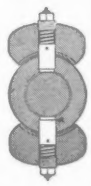
Past employment records should be closely examined to determine possible lack of adjustment to his present occupation. If he has frequently changed not only his employers, but types of jobs, he is probably not too well adjusted to his present or any previous occupation.

If he does not get along too well in his job, you may have a case of lack of proper adjustment to the particular occupation. Perhaps he simply does not possess an aptitude for this particular type of work.

Your unhappy worker may need more training in his present job or wise counsel in order to instill in him a greater self-confidence.

If there appears to be a serious inferiority complex, he may be in need of psychiatric treatment. This may also be true if the causes of the maladjustment are apparently not related to the work or the mill.

EMPTY CARS — FASTER — SAFER



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Eliminates the old fashioned, dangerous rope and weight system of operating the tripping mechanism of automatic shovel machines.

BROOKS SHOVEL HOOKS
Save time, money, accidents. Chain can't drop out of hook. Yet hook opens easily with slight hand pressure.

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J. George Kehr

PROFILE . . .

This is the first of a new series describing the men who make the milling wheels go round, the men who shut themselves away in the recesses of laboratories, the men without whom there could be no progress in the milling industry.

Appearing from time to time at district meetings of the Association of Operative Millers is a man who has great faith in the future of an organization he has served so well for many decades. He is J. George Kehr, assistant general superintendent of the Russell-Miller Milling Co. His objective right now is to boost the membership of AOM, not so much for the sake of numbers, but so that no man may miss the opportunities membership offers. He's been doing the same sort of thing, in and out of office, for 32 years.

Big, bluff and hearty, Mr. Kehr is a familiar figure to almost every operative miller from the Atlantic to the Pacific, from the northern most mill in Canada to the Mexican border. He is known to many overseas millers, too, for it is his invariable custom to seek out the stranger, the new man at an AOM technical conference and put him at his ease.

Many a young man in the industry has cause to be grateful to Mr. Kehr. His knowledge and experience are always at the disposal of the inquiring mind. It would be far from the truth to say that he looks back, as is the way with veterans, to the past, for he is not the sort of man to look back. He has chalked up 40 years of service with the Russell-Miller company, but his eyes are on the future—the future of his company, of AOM and the many organizations, charitable and service, with which he has identified himself over the years. Mr. Kehr is a do-er. And he gets things done.

In 1953 his medical advisors told him to slow down. If he has slowed down, it is not apparent to his friends. Whatever the project, he's in there pitching.

Born in New Prague, one of 13 children, he will soon celebrate his jubilee as a miller for he first entered the business in 1909. His career with R-M started in 1917 as a roll tender at the Minneapolis "A" mill. In 1918 came promotion to grinder in both the "A" and "B" mills. In 1924 he went to Buffalo as assistant mill superintendent, becoming superintendent in 1939. In 1953 he returned to his present position in Minneapolis. A former president of AOM, head of the membership committee for 10 years, he is always ready to do what he can to further the objects of the association.

Son Roy is following in his father's footsteps as a worker for AOM. With Kressilk Products, Inc., of Buffalo, Roy is secretary of Niagara District No. 8. In this capacity he is playing a prominent part in the organization of the annual technical conference in Buffalo. The Kehr tradition in the service of AOM is carried on by the distaff side of the family, for Mrs. Kehr, Jr. is secretary of the ladies committee for the conference.

As long as there are men of the Kehr devotion, AOM will continue to gain in strength and to play a major part in influencing and improving the stature of the flour milling industry.

——BREAD IS THE STAFF OF LIFE——

NEW BUILDING

SAN ANTONIO, TEXAS — Dr. Harold Vagtborg, president, has announced that Southwest Research Institute has signed a contract for construction of a $252,000 general services and administration building which is expected to be completed next Aug. 1.

——BREAD IS THE STAFF OF LIFE——

STORAGE WHEAT UPGRADED

ASTORIA, ORE. — Approximately 111,440 bu. wheat were recently removed from one of the mothball fleet ships here at a higher grade than when first stored. When loaded July 13, 1954, holds 1, 3 and 4 in the ship graded No. 1 Western White, while holds 2 and 5 graded No. 2 Western White. When unloaded last month, all holds graded No. 1 Western White.

INSIDE SCIENCE

THE VITAL STORY OF

Breakfast Cereals

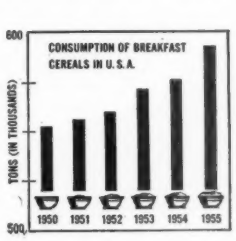
with essential vitamins and minerals restored

by Science Writer

New Edition

AMERICA LIKES BREAKFAST FOODS

Let no one doubt the popularity of breakfast cereals among Americans. The chart below traces the consumption of these fine foods between 1950 and 1955. During that period annual consumption rose by *76,000 tons*. In just one year, 1955, Americans ate 2½ lbs. of hot and 4.8 lbs. of cold cereals per person!



Why are breakfast cereals so well-liked? They are tasty; they are easily served; they appeal to busy homemakers, as well as institutional dietitians, because they are readily available in a variety of flavors at a modest cost. They add interest and value to an important but sometimes neglected meal—breakfast. Their use is extending to between-meal and party snacks, too.

Many grains are processed to make breakfast cereals: wheat, corn, oats, rice. Eaten with fruit and milk or light cream, they contribute an excellent combination of basic, flavorful, nutritious foods to the diet.

Better Foods for Better Health Through Restoration

The science of nutrition has advanced rapidly. In the manufacturing process of some cereals, some of the essential "B" vitamins and minerals are subject to some loss, just as with other foods. These losses are inescapable when such grains are prepared for human use. When this became known, manufacturers acted to overcome the losses. They adopted restoration.

Restoration simply means that certain important vitamins and minerals are restored to the cereal food during processing, so that the vitamin and mineral values in the finished product are generally equal to the whole grain values of those elements. Wheat, corn and rice products are customarily so treated. Vitamins B_1 (thiamine), B_2 (riboflavin), niacin (another "B" vitamin), and the mineral, iron, are those most widely restored. Vitamins C and D are also sometimes added.

Pre-sweetened cold cereals emphasize the nutritional importance of added vitamins. Increased calories require more "B" vitamins for best utilization of the food.

Why the Vitamins are Important

Physicians and diet experts have proved that vitamins are essential to prevent certain deficiency diseases and to contribute to robust good health.

Vitamin B_1 (thiamine) helps build and maintain physical and mental health. It is essential for normal appetite, intestinal activity, and sound nerves. A lack of this vitamin leads to beriberi, a rarity in the U. S. A., but still a very serious health problem in other parts of the world.

Vitamin B_2 (riboflavin) is essential for growth. It helps to keep body tissues healthy and to maintain proper function of the eyes.

Niacin is needed for healthy body tissues. Its use in the American diet has been largely responsible for the virtual disappearance of pellagra, a serious disease.

Vitamin D helps children develop normal teeth and bones. It prevents the development of certain abnormal bone conditions in adults.

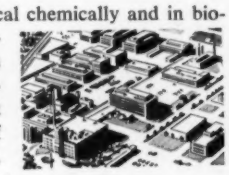
Iron is essential for making good red blood and for the prevention of nutritional anemia.

Where Do the Vitamins Come From?

At about the same time that processing losses in breakfast cereals became known, other developments in the scientific world made available ample supplies of vitamins at economical prices. Thus, the nutritional contribution of some breakfast cereals could be, and was, greatly improved through restoration.

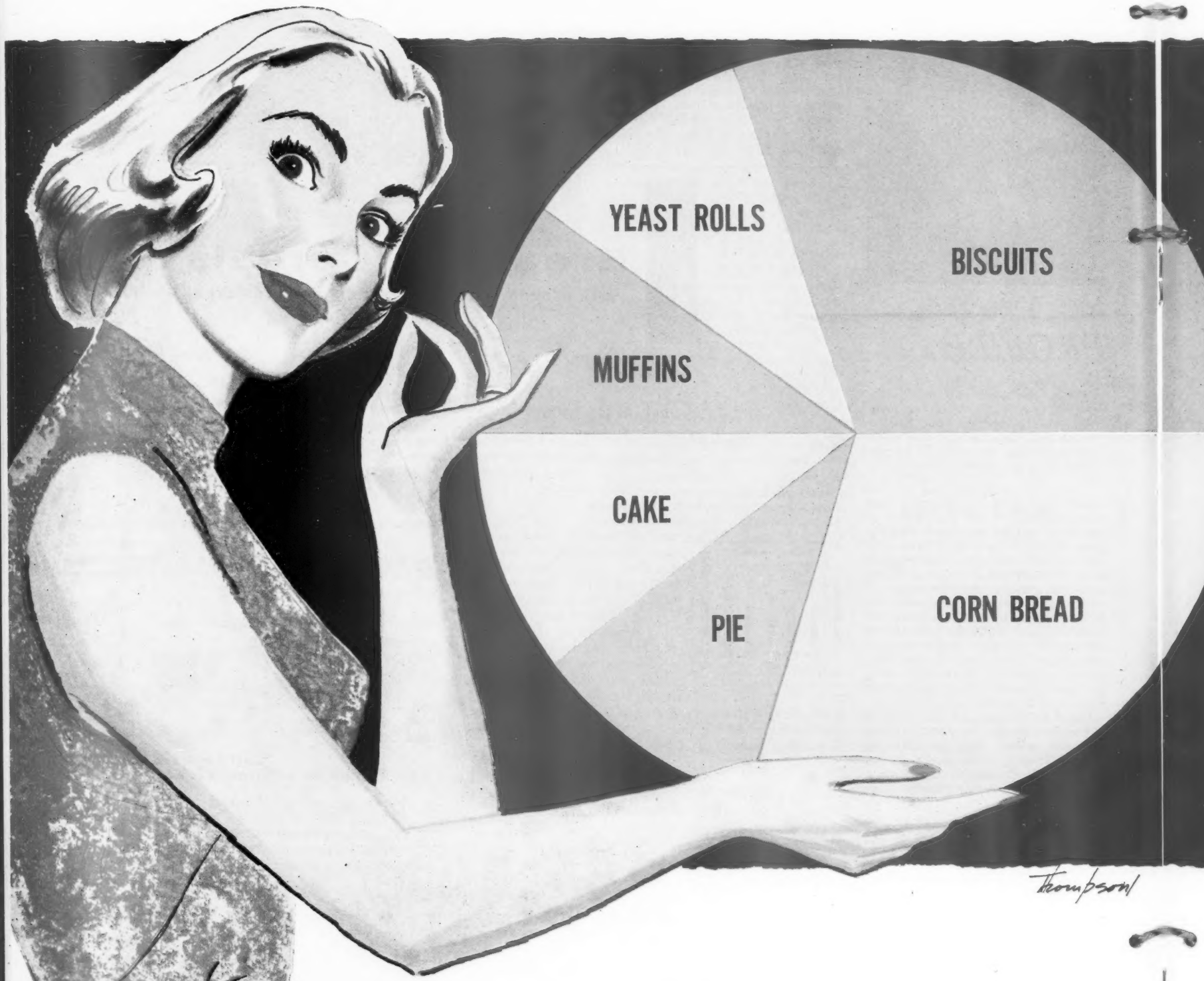
Since the early days of breakfast food restoration and of white flour and white bread enrichment, the world-famous firm of Hoffmann-La Roche has supplied top quality vitamins *by the tons*. Pioneering work in its laboratories and by its collaborators resulted in the "duplication" of some of nature's extremely complex substances. First, the chemical composition of the vitamin was learned. Second, the pure substance was isolated. Third, the "duplicate" was made by synthesis. And fourth, the laboratory techniques were extended to large scale commercial operations.

The manufactured "duplicate" is identical chemically and in biological activity with nature's own product. A vitamin is still a vitamin regardless of whether nature or man made it. So efficient is large-scale manufacturing, that vitamins are sold at a lower cost than if they were extracted from natural sources.



This article is one of a series devoted to the story of vitamin enriched or restored cereal products: white flour, white bread and rolls, corn meal and grits, macaroni products, white rice, breakfast cereals, farina. Reprints of this article, of any other in the series, or of all are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada, Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

FUTURES



THE SOUTHERN HOUSEWIFE BAKES 520 TIMES A YEAR

The southern housewife says she "loves to bake" and proves it by baking on the average of 520 times a year! But the biggest news is that two-thirds of her bakings are biscuits and corn bread—both "naturals" for self-rising flour and self-rising corn meal.

The chart shows just how big baking is in the South. Biscuits and corn bread together account for two-thirds of the average weekly baking.

uncovers the Secrets of Successful Promotion

Enthusiastic millers are talking more and more about bounding sales of self-rising flour—sales that result from promotions built around the five sure-fire appeals uncovered in FUTURES.

For the first time FUTURES pinpoints the five keys that motivate the housewife in her home baking. They are the very reasons why she bakes—and why she asks for the brand of self-rising flour that promises her:

1. The family-emotional rewards of baking.
2. Consistently successful and convenient baking.
3. The advantage of multiple use.

and the twin appeals . . .

4. Enriched with calcium.
5. Low in calories.

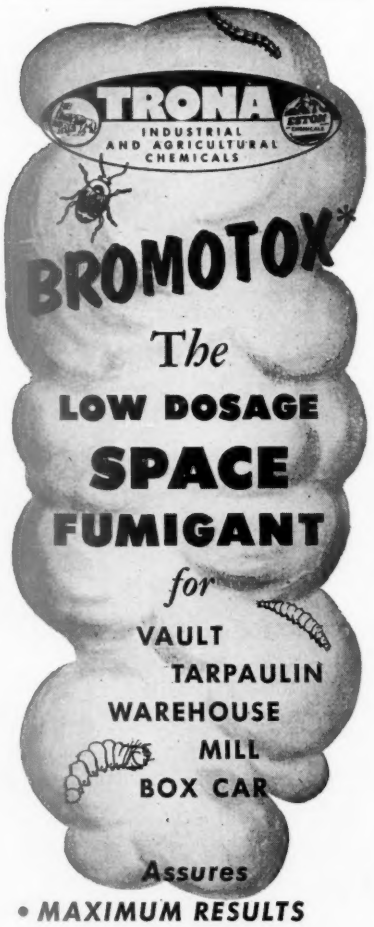
ARE YOU USING THESE KEYS to a BIG, BIG *MARKET?*

There is no end to the variety of powerful newspaper ads, radio and TV commercials, displays, direct mail and other promotional material that can be built around these five strong appeals. Ask your V-90 Representative to show you how your promotion can move the housewife . . . move your brand of self-rising products into more and more kitchens.

Victor Chemical Works, Dept. MP-49, 155 N. Wacker Drive, Chicago 6, Ill.

VICTOR
Dependable Name in Chemicals for 59 Years

There's only one phosphate to put the rise in your self-rising products — that's Victor's V-90



- MAXIMUM RESULTS
- GREATER SAFETY
- MORE ECONOMY

Bromotox, a mixture of ethylene dibromide and methyl bromide, is an effective, safe and economical space fumigant. The stronger odor and lower dosage requirements of Bromotox result in greater killing power, increased economy and maximum safety. It is longer lasting, more penetrating and leaves no residual odor. Bromotox allows positive control of granary and rice weevils, Angoumois grain moth, confused flour beetle, Mediterranean flour moth, raisin moth, cheese mites and many other pests infesting grain, flour, rice, cheese and dried fruits. Available in cans packed twelve per case as well as 10, 50, 120 and 170 pound cylinders.

*TRADE MARK AP & CC

Other Eston Fumigants:

ESTON METHYL BROMIDE
The Versatile Fumigant

M-B-C FUMIGANT
Methyl Bromide with 2% Chloropicrin

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Midwestern Distributor

FERGUSON FUMIGANTS

810 S. FLORISSANT ROAD
FERGUSON 21, MISSOURI

FORM # 2488 (2-57) MIDDS PURIFIER PERFORMANCE TEST DATE:

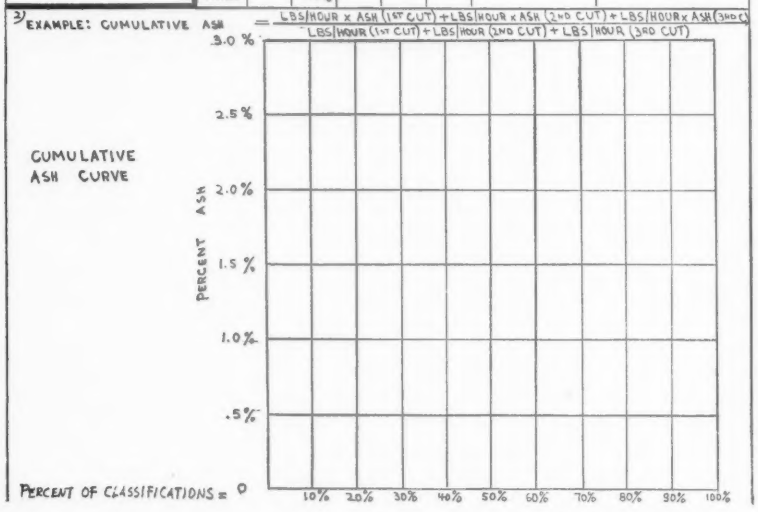
TEST #	PURIFIER NO.	CLOTHING MESHES	ORIGIN OF INCOMING STOCK
MANUFACTURER, SIZE + MODEL			DISPOSITION OF STOCKS
RPM + THROW			
SIEVE HANGER ADJ. + PITCH			

	INCOMING STOCK: GRANULATION MESH	GRAMS	%	LBS/HOUR	VITREOUSNESS[1]	ASH	MOIST.	TEMP.	STOCK-DEPTH	AIR-VOLUME CFM	ROOM TEMP.	ROOM HUM.	NOTES.
OVER													
OVER													
OVER													
OVER													
THRU													
TOTAL			100%										

[1] ESTIMATED
% VITREOUS
% MEALY

CLASSIFICATIONS: STREAM	LBS/HOUR	% TOTAL	MOIST.	ASH.	%[2] CUM. ASH	COLOR	NOTES
1ST CUT							
2ND CUT							
3RD CUT							
TAILS							
TAILS							
TAILS		100%					

[2] EXAMPLE: CUMULATIVE ASH = (LBS/HOUR x ASH (1ST CUT) + LBS/HOUR x ASH (2ND CUT) + LBS/HOUR x ASH (3RD CUT)) / (LBS/HOUR (1ST CUT) + LBS/HOUR (2ND CUT) + LBS/HOUR (3RD CUT))



This is the recommended report sheet for the AOM Technical Committee's proposed purifier test.

AOM Technical Committee's Proposed Purifier Test

EDITOR'S NOTE: This report was prepared for the Association of Operative Millers' technical committee by a subcommittee of E. S. Dybevick, International Milling Co., Minneapolis; David Mattson, Atkinson Milling Co., Minneapolis; and Ralph W. Bouskill, Purity Flour Mills, Ltd., Toronto. This group administered the purification project.

1. OBJECTIVE.

The objective of this proposed purifier test is to provide a means by which the operative miller can assure himself that his purifiers are adjusted properly. As a second objective, this proposed test could be used as a means for comparing the performance of various sizes and designs of purifiers. The number of tests for any experiment would be determined by the objective.

Flour mills employing purifiers, regardless of design, have two groups of factors that contribute to efficient purification—the usual operating constants and variables.

2. THE OPERATING CONSTANTS.
   (a) Sieve size and design of purifier.
   (b) The R. P. M. and eccentric throw.
   (c) Sieve hanger adjustment and sieve pitch.
   (d) Clothing meshes.
   (e) Origin of incoming stock.
   (f) Disposition of classifications.
3. THE OPERATING VARIABLES.
   (a) Feed rate of incoming stocks.
   (b) Granulation and vitreousness of incoming stock.
   (c) Appearance and ash content of incoming stock.
   (d) Moisture of incoming stock.
   (e) Temperature of incoming stock.
   (f) Air volume used (cfm).
   (g) Depth of stock on sieve at head end.
   (h) Room temperature and humidity.

The fluctuations of the operating variables are the result of mill mixes, weather conditions, mill settings, conditioning, etc.

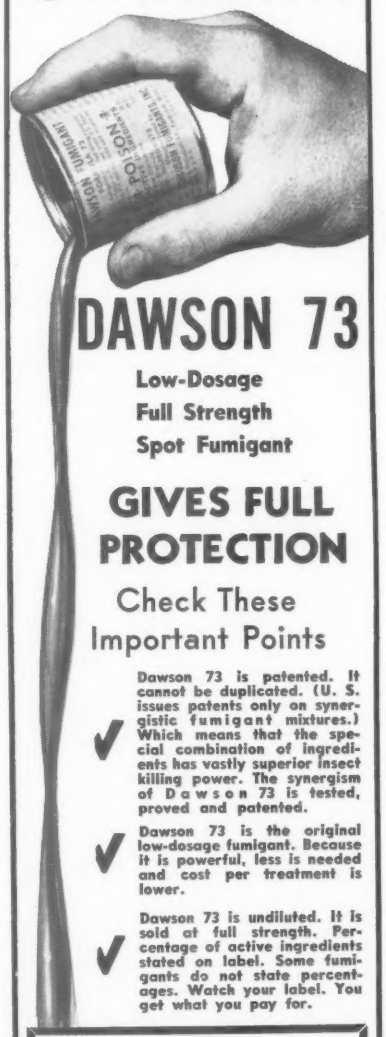
4. TEST PROCEDURE.

To test and evaluate the performance of a purifier, the constants must be known and recorded. The usual range of variables must be known, and the variables measured during the test. The purifier which may be selected for testing should have at least four finished stock classifications, including head, middle, tail cut and tailover.

The procedure for the testing and evaluation of a purifier is as follows:
   (a) The record of constants, item (a) through (f).
   (b) The measurement and recording of variables, items (a, e, f, g, h).
   (c) Analysis and evaluation of

(Continued on page 34a)

FUMIGATE
With Full
CONFIDENCE



DAWSON 73
Low-Dosage
Full Strength
Spot Fumigant

GIVES FULL PROTECTION

Check These Important Points

✓ Dawson 73 is patented. It cannot be duplicated. (U. S. issues patents only on synergistic fumigant mixtures.) Which means that the special combination of ingredients has vastly superior insect killing power. The synergism of Dawson 73 is tested, proved and patented.

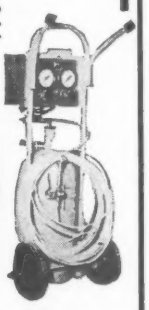
✓ Dawson 73 is the original low-dosage fumigant. Because it is powerful, less is needed and cost per treatment is lower.

✓ Dawson 73 is undiluted. It is sold at full strength. Percentage of active ingredients stated on label. Some fumigants do not state percentages. Watch your label. You get what you pay for.

APPLY EASILY EITHER METHOD

A Available in 2-inch shot can. One can equals knock-out strength of about a quart of conventional fumigant. Just punch and pour in fumigation ports now used. No handling bottles, wasted time, broken glass. No fumigant lost. Order case of 48 cans today.

B For large mills, use "Little Squirt" applicator. Two men can fumigate average mill in two hours. Cuts costs substantially. No equipment to buy. No initial investment. Ask for details.



DAWSON LOW-DOSAGE FUMIGANTS

FERGUSON FUMIGANTS

810 S. Florissant Rd.,
FERGUSON 21, MISSOURI
In Canada: Kipp Kelly, Ltd., Winnipeg and Toronto

WHAT TO LOOK FOR IN USED LIFT TRUCKS

By R. F. Moody
Hyster Company

Undertaking a modernization program may mean that it will be necessary to cut costs of some other operations in the mill until the cost of the program has been paid. Purchase of used lift trucks may be in order to cut expenses. They can be a good investment or a source of trouble—depending on the care with which they are selected.

When a used lift truck is being considered for purchase, both its basic specifications and its operating condition should be carefully analyzed. A reputable dealer will provide invaluable assistance, but in most instances, the potential customer knows his requirements and his plant far better than any outsider.

TABLE 1—General Truck Specifications*

Type of Truck:	
Make:	
Model:	
Serial No.	
Year:	
Availability of replacement parts:	
Rated capacity, lb.	
At load center, in.	
Load arms length, in.	
Thickness, in.	
Width, in.	
Lift height, in.	
Over-all lowered height, in.	
Free lift, in.	
Turning radius:	
Aisle widths	
90 deg. stacking, in.	
90 deg. intersecting, in.	
Maximum grades	
Per cent no load	
Per cent full load	
Operating speed	
Travel speed:	
Lifting speed:	
Underclearance	
Under uprights, in.	
Under center, in.	
Approximate weight:	
Floor loading (with full load)	
Type tires:	
Type power:	
Accessories	
Guards, load:	
Overhead:	
Power steering:	
Automatic transmission:	
Hour meter:	
Fire extinguisher:	
Towing hook:	
Others:	
Special attachments	
Boom:	
Scoop:	
Hydraulic clamp:	
Others:	

*Hyster Company.

Why should a used truck be considered at all? New equipment is obviously more reliable, safer and has refinements that are unavailable in used models, even though they be of recent vintage.

Of the numerous reasons, one is most important: lower first cost. The amount that can be saved by purchasing second-hand equipment depends entirely on the individual truck. Generally, used trucks are offered under one of two conditions, "as is" or "rebuilt." Actually, some manufacturers, such as the Hyster Co., suggest three basic categories for used lift truck equipment—"as is," "good value" or "hy-quality." The "hy-quality" tag is confined to trucks that are rebuilt to factory standards and are warranted for a fixed period of time. The "good value" tag is applied to a truck that has been put in first-class operating condition but not necessarily completely rebuilt, where the "as is" truck is exactly as stated—in the same condition as it was when traded.

Most dealers do some work on trucks that are over four or five years old. If the second-hand truck that you are considering is of this age and has been reconditioned but not rebuilt, it can be expected to have a life of 60 to 70% of that of a new truck. If it is only three to four years old, and again is properly reconditioned but not necessarily rebuilt, it should have a useful life of 75 to 85% of a new truck. The life of a rebuilt machine, on the other hand, should approximate 90% of the life of a new machine.

Yet, the cost of used equipment is not proportionate to its anticipated life. It is less. Again, how much less depends on the machine and local circumstances. It may be as little as 30%, as much as 70%.

Naturally, savings are important when capital is limited, and therefore a used truck is often purchased by the small manufacturer or distributor. It allows him to mechanize his operations and save approximately the same amount of time and money as when using new equipment. Many used truck purchasers are companies that never have owned a lift truck before.

This is not always the case, however, for larger companies frequently buy used equipment to supplement existing fleets during peak production periods. Since a used truck costs less, the depreciation that must be charged against it as overhead when it is not working is much less than what might be charged against a new machine.

Still another reason for buying a

Some of those groceries would be as out of date today as the rumble seat itself! As you know, new processing methods, new packaging, new ingredients have changed many food products.

Even staples like family flour have been improved, thanks to vitamin enrichment. Today, food buyers *expect* food products to carry the "ENRICHED LABEL".

Twenty years ago, just about the time the rumble seat was on its way out, mass production of vitamins was just getting underway. One of the first companies to master the techniques of manufacturing quality vitamins was Chas. Pfizer & Co., Inc.

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used lift truck is to fulfill production requirements while waiting for new equipment.

How to Get the Right Truck: The first requirement for a lift truck—either new or used—is that it be adaptable to the job the prospective buyer has in mind and that it be capable of operating efficiently. Therefore, the same basic conditions that must be analyzed when selecting a new truck apply also to a used one:

1. **The truck must have the rated capacity** to lift the loads in the potential buyer's plant. Most buyers like to obtain a machine rated at somewhat higher capacities than the maximum size load that they normally encounter. This is good practice, but there is a limit, for the efficiency of a truck is greatest when the loads that are handled are closest to the machine's rated capacity. Operating costs, too, are less.

But, capacity is not the entire story. Trucks are rated at a capacity of a given load center, generally 24 in. This means that if the normal load is wider than 48 in., the truck capacity is decreased. So, this is an important factor to check.

2. **Other basic considerations** are lowered mast height and truck stacking height. On occasion, buyers have purchased lift trucks only to find that the lowered height of the machine was higher than their doorways and thus that there was no way to get the truck from one area of the plant to another, or that the truck was incapable of stacking to the desired height, thus wasting valuable warehouse or storage space.

3. **The amount of under-clearance** affects the areas in which a truck can be used, and here there are two requirements — the under-clearance under the uprights and also under the center of the frame. Too little clearance may cause the truck to "hang-up" on ramps.

4. **Floor loading** is important, particularly in older plants, so the total weight of the truck with and without load should be considered before purchase. The determining factor, of course, is not total weight but its distribution; a four-wheeled machine with pneumatic tires will distribute weight and load over more floor area than a similar machine with solid or cushion tires.

5. **The type of tires** that are on the truck govern to a large extent where it can be used. Solid tired machines, for example, are not adaptable for outdoor use. Pneumatic tired machines can be used either in or out of doors, as can, to a lesser extent, solid-cushion machine.

How to Determine Truck Condition: Over and above the factor of ability to meet a given requirement is mechanical condition. There are many points that should be checked here, perhaps the most important of which is that the purchaser buy from a dealer who represents a well-known and reputable lift truck manufacturer. Among the things that can be checked are the following:

6. **If the truck has been reconditioned** and is warranted, obviously used parts are available. If, however, it is offered in the "as is" condition, the prospective buyer should determine whether replacement parts can be obtained.

7. **The manufacturer's name** is an important consideration. Like many other industries the fork truck industry has consolidated, and some trucks were made in earlier years that are no longer on the market. A used truck with an obsolete name is a poor buy.

8. **A rebuilt truck,** of course, is usually in better condition than one that is offered "as is." Generally, it has been steam-cleaned and painted; the frame has been repaired by welding, if necessary; it has a new clutch and new brake lining; the engine has been rebuilt; the hydraulic system has been overhauled; wheel bearings have been checked and packed; tires are in good condition and other components have been checked and repaired. In some instances, however, an "as is" truck is an excellent buy.

9. **Most used trucks** do not come equipped with attachments other than forks. This, of course, is not always the case. A machine may have mechanical or hydraulic attachments which, if they can be used, are a "plus" in the sale. However, the buyer who purchases a used truck with the idea of fitting a new hydraulic attachment to it sometimes is faced with a costly or possibly an insurmountable problem. Current attachments may not be adaptable to obsolete trucks.

10. **A visual check** of the truck is obviously wise. Its general appearance, cleanliness and absence or presence of waste, dirt and grease are good indications of how well the truck has been maintained.

11. **Mechanical condition** is, of course, very important. Among other things that the buyer will want to check will be the action of the clutch pedal to determine whether it has the proper amount of "free pedal travel"; too much may indicate a worn clutch. Steering column should be checked for play, and if the truck is equipped with power steering, the operation should be checked without a load on the forks—generally the most severe condition.

The truck should, of course, be driven and the condition of the brakes can be determined. Driving it over rough ground will shake off any parts that are loose and indicate serious structural defects. Driving it up a grade to see if the engine

There was a time, and not too long ago, either, when a snuff-box was part of every gentleman's equipment, and even though a snuff-box is a collector's item today, snuff, as precious cargo, is still on the market in somewhat limited quantities.

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maintains power is recommended, and during tryout, the prospective buyer should drive it through each gear ratio to determine the condition of the transmission.

12. When the truck is being driven, the operator should speed it up and decelerate it abruptly to determine if there is play in the gears. Alternate deceleration and acceleration will cause a "clunk" if the transmission is in poor condition.

13. The truck should be checked under load to make sure that the lift mechanism works properly and that it will support the rated load. The tilt mechanism should be checked at the same time. Running the truck through the lift and tilt cycle will indicate if the relief valve is kicking out properly at the end of the tilt or lift cycle, and also if there is wear in the valves or packing. A good approach is to make this test on a clean surface or a piece of kraft paper. Oil leakage will show up immediately.

14. Operation of the engine should be analyzed by several means. One way is to use a compression gauge, which will indicate if there is valve leakage or if the rings are worn or cracked. Putting a vacuum gauge on the engine intake manifold will also indicate the condition of the valves. A simple check can be made by removing the oil "dip stick" and inspecting the condition of the oil. Allowing the truck to idle for 15 to 20 min. is a wise precaution. If it overheats, the cooling system may be defective. At the same time, the water in the radiator should be checked for rust and scale, the hose should be inspected for cracks, all connections should be inspected.

15. The speed of the lift is an indication of the condition of the hydraulic system. If the hoist cylinder rises slowly, the pump may be worn. Likewise, if the hydraulic fluid becomes hot, the pump may be in bad condition. Above all, it is wise to make sure that the lift and tilt cylinders are not scored and that the flexible connections in the hydraulic system do not show signs of wear.

16. The condition of the uprights is important. If they are damaged or bent, they may not be capable of supporting the rated load. Also check the condition of the load rollers and side rollers, for excessive side play would indicate replacement. All bushings and bearings should be checked, particularly those that act as pivot points. The condition of the steering spindles can be determined by looking to see if they are worn and still in one piece, or if they are ball or roller bearing types to determine if any balls are missing from the races.

17. The electrical system — particularly the generator, battery and distributor — should be inspected. Starting the engine will indicate the condition of the starting motor. It is an easy matter to take the bank off the generator to determine if the brushes are sparking, just as it is a simple matter to check the wiring for frayed or worn condition.

18. The condition of the tires is important. If the sidewalls are badly notched or bruised, new tires may be required. If the tread is worn thin and the tires have not previously been recapped, recapping may solve the problem. An industrial truck pneumatic tire can be recapped several times.

Solid cushion tires present another problem. Badly worn units cannot be recapped, but tread is no indication since there is little tread on a solid cushion tire to begin with. Points to check are the thickness of the tires, the condition of the bond between the rubber and the wheels, and the absence or presence of "chunked-out" sections.

19. There are many other points to analyze—the condition of grease fittings; condition of instruments; condition of lights, if they are available in the truck; the condition of the horn.

Close Checks Pay Off: All this

BAKERY SALES DOLLAR VOLUME RISES

WASHINGTON—The total volume of sales by bakery products stores in the U.S. in January of 1957 was $72 million, compared with only $71 million in January of 1956, according to a monthly retail trade report from the U.S. Department of Commerce.

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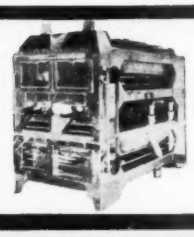

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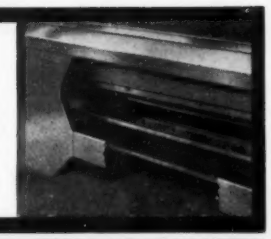

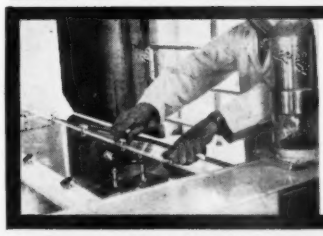

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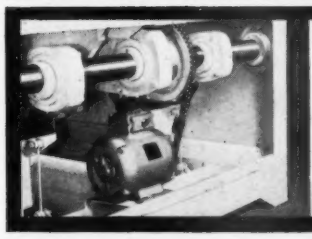

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The DAY Dual-Clone (above-right) has low horsepower requirements and operates with unusually low back pressure. It requires no maintenance.

For latest information about DAY "AC" and Dual-Clone equipment write toDAY for Bulletins 559 and 49-DC.

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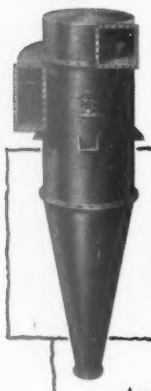

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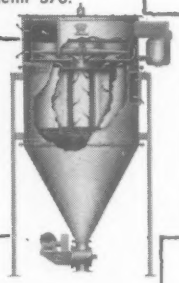

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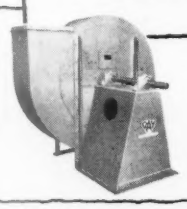

DAY TYPE "G" EXHAUST FANS
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Lift trucks have found increased use in feed plants. Before a feed mill operator purchases a used truck, he should check on a good many things. The accompanying article lists some of them.

sounds complicated, but the plain fact is that it sounds more complicated than it is. And any energy that the prospective buyer expends in making sure that he is getting the truck that he wants, in the operating condition that he wants it, is well worth the investment. A used truck may cost from a few hundred to several thousand dollars, and not only the manufacturer who made the truck but the dealer who is selling it will prefer to have a satisfied customer. The checklist may be the difference.

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George S. O. Smith
Treasurer, AOM . . .

Pacific Northwest Farmers to Plant Less Wheat

PORTLAND — Pacific Northwest farmers—those in Oregon, Washington and Idaho—will plant fewer acres of wheat this spring, according to surveys in these states.

The Washington Crop and Livestock Reporting Service reports Washington farmers intend to plant about 13% less acreage in spring-sown plants in 1957 than they did a year ago.

The decrease is due mostly to a reduction of spring wheat planting. Increases are expected for all feed grains, with barley showing an increase of 66,000 acres.

Idaho farmers intend to plant less acreage to spring wheat, oats, dry beans and dry peas. A report from the Agricultural Marketing Service in Boise, however, indicates that Idaho farmers will increase their plantings of corn, barley, sugarbeets and hay. Combined acreage plantings in 1957 in Idaho are figured to be 1% higher than a year ago.

Mrs. Elvera Horrell, extension agricultural economist at Oregon State College, said total planted acreage of 59 major crops in the U.S. may be 12 million acres under the 1956 total.

A 20% reduction in spring wheat planting in Oregon is in evidence, and lesser reductions will be noted for corn and oats planting.

Oregon farmers, Mrs. Horrell's report indicates, will increase their hay acreage. They also plan a 7% increase in sugar beets, 9% in oats and 10% in barley.

——BREAD IS THE STAFF OF LIFE——

Mite Reported Sole Carrier Of Disease

WASHINGTON — A three-year search for insects and mites that could spread the highly destructive wheat streak-mosaic virus has revealed that the wheat curl mite is probably the only carrier of this virus in the Great Plains region, the U.S. Department of Agriculture has announced.

The search was made in cooperation with the Kansas and Nebraska Agricultural Experiment Stations by R. V. Connin of USDA's Agricultural Research Service, and R. Staples of the Nebraska station.

The wheat curl mite was implicated as the carrier of this virus in Canada by Dr. J. T. Slykhuis in 1953.

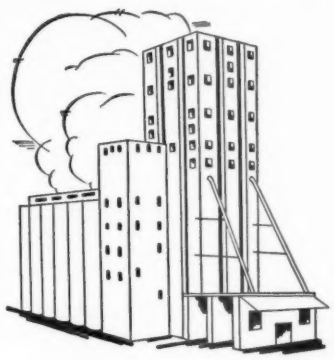
Wheat streak-mosaic has been especially destructive to winter wheat in western Kansas and has caused severe damage in Nebraska, Colorado, and South Dakota. Some loss to the disease is reported also in Wyoming and western Iowa, and at scattered points elsewhere in the U.S.

The disease has wiped out entire wheat crops in some areas. The virus invades and grows within the wheat plant, destroying the all important green pigment, chlorophyll, and causing plant leaves to become streaked, spotted, or mottled with yellow. Growth of the plant is hampered or halted.

Over the years, several insects have been suspected as transmitters of this virus. Insects and mites investigated in the recent cooperative study included the greenbug, crown aphid, English grain aphid, apple grain aphid, corn leaf aphid, six-spotted leafhopper, painted leafhopper, migratory and two-spotted grasshoppers, thrips, brown wheat mite, chinch bug, wheat stem maggot and others. None of them was found to transmit the wheat disease. Only the wheat curl mite was positively tagged as a carrier.

Wheat curl mites are hard to see with the naked eye. They easily pass through screen and cloth barriers that confine many of the smaller insects. The tiny mites are often found clinging to the legs of aphids and thrips, small insects that feed on plant juices.

Researchers surmise that reported cases of transmission of sreak-mosaic virus by other insects might have been caused by the unknown presence of the wheat curl mite. Insects carrying their mite burden from infected plants could have spread the infection.



How To Get A Grain Fumigant As Good As Weevil-Cide

For many years a typical competitive sales pitch has been, "We've got the same thing as Weevil-Cide — every bit as good — and our product is cheaper."

Despite the implied compliment to Weevil-Cide, we never especially cared for this comparison — mainly because it was never true.

It was never true in the past. It isn't true now. There've been some approaches in recent years. But we can still say no one has duplicated Weevil-Cide — nor, at equal dosage, Weevil-Cide results.

So — there's still only one way to get a grain fumigant as good as Weevil-Cide. Get Weevil-Cide.

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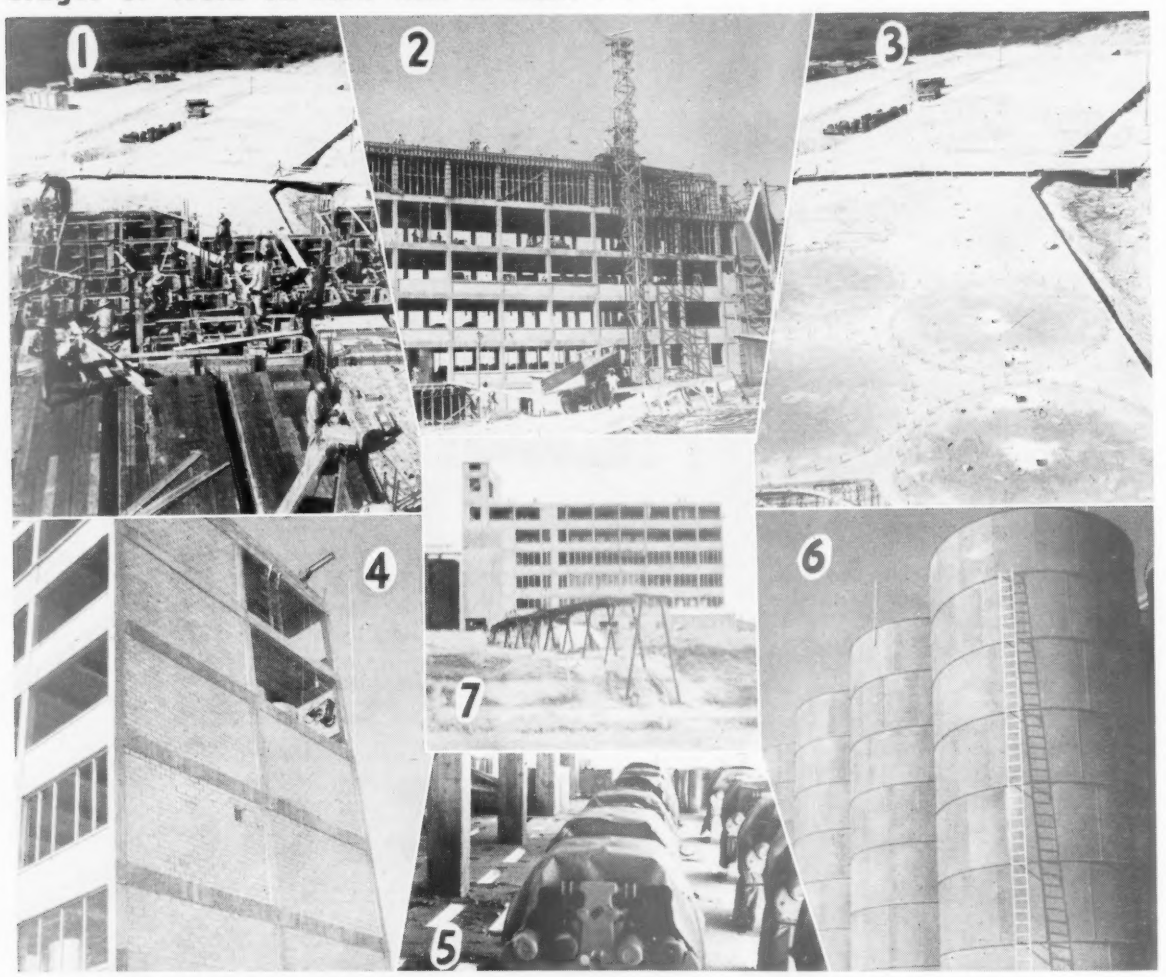
Stages of Work on New Mill in Haiti . . .



HAITI MILL CONSTRUCTION—Here are views of stages of construction of the flour mill of Societe Haitienne De Minoterie, S.A., at Port-au-Prince, Haiti. All machinery and engineering for the mill is being supplied by Allis-Chalmers Manufacturing Co. Ground was broken for this project in August, 1956. View No. 1 shows workmen setting forms for the first floor. View No. 2 was taken during pouring of concrete for the fifth floor. The foundation for the grain storage tanks is shown in view No. 3. The next view, No. 4, reveals the architectural details of an end section of the mill. Roller mills await installation in view No. 5. Steel silos are in place in view No. 6, and view No. 7 shows the new mill as it appeared in March. All of the machines, transmission machinery and bucket elevators have been installed. The spouting work is under way, and it is now contemplated that the mill will go into operation around June 1. A mechanical mill in lieu of a pneumatic installation was selected as it was felt that the former will better suit local conditions, and the owners want the flexibility provided by mechanical handling equipment. A full report on the new mill is scheduled to be presented during the annual technical conference of the Association of Operative Millers at Buffalo April 29-May 2.

Results of Experiments on Distributing HCN In Bulk Grain With Aeration System

By G. L. PHILLIPS

EDITOR'S NOTE: One of the features of a recent issue was an article by Mr. Phillips on experiments on distributing liquid fumigants in bulk grains with aeration systems. Mr. Phillips is with the Stored Grain Insects Laboratory of the U.S. Department of Agriculture field station at Manhattan, Kansas, and in this article he describes another of a series of experiments he is conducting on distributing fumigants in bulk grain.

The results of preliminary tests wherein HCN was distributed in large steel storage tanks by adapting the existing aeration systems so as to recirculate the fumigant through the grain masses are described in this report.

The tests were conducted at Redell, Kansas, in two large steel storage tanks filled with wheat. The studies were a cooperative effort by the Stored-Products Insects Laboratory of the U.S. Department of Agriculture field office at Manhattan Kansas, the American Cyanamid Co. and Dannen Mills.

Each tank had a volume of 225,389 cu. ft. and held approximately 155,000 bu. wheat. The aeration system in each tank consisted of two parts, one in each half of the tank. Each half consisted of a main duct extending in from one wall and a series of lateral ducts made of expanded metal covered with window screen wire. The main duct was reduced in size between each pair of laterals. Each half was equipped with a blower powered by a gasoline engine that gave an air flow rate of 0.12 c.f.m./bu. in tank A, and 0.04 c.f.m./bu. in tank B. This great difference in air flow in the two tanks was later found to be due to collapsed ducts in the north section of tank B.

Wheat Condition

For fumigation purposes, a duct was added to each blower to return the blower discharge to the overspace.

The wheat in tank A was in good condition, as evidenced by easy penetration of probes. The temperature of the wheat ranged from 56 to 87 degrees Fahrenheit. Moisture content was 10.54% on the surface, 11.86% two feet deep, and 10.78% three feet deep.

The wheat in tank B was compacted in certain areas, as indicated by difficulty in inserting probes. The temperature ranged from 27 to 95 degrees Fahrenheit. Moisture content at the surface was 12.3%, and at three feet was 11.04%.

After the gas had been applied and the gas samples drawn and analyzed, it was found that no gas had reached certain bottom portions of the grain mass. On inquiry, the warehouseman recalled that a duct had crumpled during filling and had probably blocked off the air flow at those points.

Gas samples were taken at depths of 1, 6, 12, 18 and 24 ft. in each quadrant 12 ft. from the wall, the quadrants being designated A, B, C and D; and at the center. One sample was also taken of the overspace. Samples were taken at the two-hour, six-hour, and 24-hour periods.

(Continued on page 32a)

Opposition to Freight Hikes Registered

AFMA Statement Notes Effects of Proposed Increase

CHICAGO—"Farmers are caught in an alarming price squeeze, and a further increase in transportation costs would result in a hopeless economic situation for them." So stated W. E. Glennon, president of the American Feed Manufacturers Assn. to the Interstate Commerce Commission in opposing a 17% freight rate increase on grain, feed and related products proposed by the railroads.

Mr. Glennon, speaking on behalf of the national feed industry, declared that "transportation already represents a heavy cost figure which must be reflected in the selling price of livestock and poultry feed. If rail carriers are granted an additional freight rate increase, it cannot be absorbed by feed manufacturers and must be passed on to farmers and feeders."

Mr. Glennon's statement was combined with that of Dr. L. C. Cunningham, noted agricultural economist from Cornell University. Dr. Cunningham said that because of increases in freight rates and handling charges, the so-called gross spread about doubled in the 1940's and has increased further in the 1950's, in grain deficit areas such as the Northeast.

Dr. Cunningham explained: "Over the decades of our history . . . as centers of population have grown and as food habits of the people based upon meat, milk and eggs have developed, the phenomena of 'feed-deficit' areas have been created. Out of this whole development has been born a commercial feed industry which performs a strategic service for livestock producers on one hand and urban consumers on the other."

Dr. Cunningham continued: "The flow of these feed ingredients to mixing plants and the movement of the prepared feeds to the areas of consumption have become a major segment of American agriculture. Anything which inhibits this flow detracts from the food standard of living of the people."

He concluded: "A disturbing element in this whole feed surplus-feed deficit (area) situation is the ever-widening margin of costs between the points of origin of the grains and other feed materials and the points of use or consumption of the prepared feeds. Any increase in freight rates would inevitably mean higher feed prices, which in the light of the current price-cost squeeze generally in farming, would add unduly to the already heavy financial burdens of livestock producers."

Mr. Glennon pointed out that AFMA represents an industry moving more than 35 million tons of grains, grain products and other raw ingredients into their plants and an equal tonnage of finished feed out to livestock producers.

He noted that members of his association will also file individual statements of opposition, pointing out that any additional increase in rail rates will divert more and more tonnage to motor carriers and other forms of transportation.

PAUL L. DITTEMORE

(Continued from page 1a)

of the future" with respect to the location of consumer markets is of equal importance to the mill itself. The federal government's long range super-highway program could have a profound effect on the location of those milling plants.

Power and transportation in the past always have been determining factors in the choice of locations for milling plants and transportation facilities will continue to be an important factor in that decision. Observers in the Midwest do not need to be reminded of the increasing use of over-the-road transportation for hauling livestock and grain from the producing areas to the primary markets. If one has any doubts, let him drive through the stockyards district of Kansas City, Wichita, St. Joseph, Omaha, St. Paul, Chicago or any other livestock market. The same curiosity about the amount of grain received by truck will produce a similar conclusion: The location of a packing plant or a flour mill or any other factory no longer is totally dependent upon rail transportation.

It is the considered opinion of many qualified observers that the federal government's super-highway network will bring about a dislocation or relocation of factories and that plants producing food or commodities for the consuming public could be located nearer to their markets rather than to the source of production of the raw commodity. Mention is made of the economic factors which led to the development of two of this country's larger milling centers: Minneapolis and Kansas City. With Minneapolis, it was because of the abundant supply of power. Back in the 1860's, 70's and 80's, "power" to a flour mill owner meant waterpower and the Falls of St. Anthony was lined with mills. Minneapolis did not develop as a primary milling center because of its proximity to the wheat fields of Montana, the Dakotas and Minnesota.

Nuclear Power

The development of nuclear power plants will cause the powersource factor to drop out of the plant location equation. One pound of coal will

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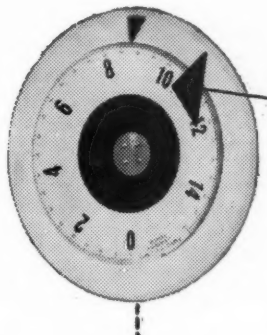

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produce 3½ kwh of power while one pound of uranium will produce 10,200,000 kwh, or, expressed in terms of btu, 12 thousand as against 35 million. Power plants in the future will not have to depend on coal fields or water falls.

Power engineers predict that, with the development of nuclear power plants, electricity for residences will be so cheap that the power companies will not bother with meters. A flat charge per residence will be the rule and the customer can use as much as he wants.

Kansas City (and interior Kansas) owes its development as a milling center mainly because of its location with respect to rail transportation and source of supplies of wheat. Several transcontinental railroads thread their way through the wheat fields of Kansas, Nebraska, Oklahoma and Texas and Kansas City was a logical place to build flour mills.

Consider this fact: It always has been, and probably will continue to be cheaper to ship raw products rather than finished goods. A leading manufacturer of scouring powder, for example, can ship his raw product from Kansas to his plant in Brooklyn and then "back-haul" his finished, packaged scouring powder to the Midwest at a good saving in transport costs between raw and finished goods. The same condition prevails with regard to the manufacture of flour. Buffalo was not developed as one of the Big Three milling centers because of its proximity to the abundant water-power generated electricity from Niagara Falls but because of its accessibility to navigation over the Great Lakes. The savings in transport costs (wheat to Buffalo vs. flour to the Buffalo railhead) probably has paid many times over the construction costs of those mills.

So, it seems safe to make the observation or "guess" that, in the future flour mills will be located even nearer the centers of consumption than they presently are located. Flour mills within short truck hauls of Boston, New York, Baltimore, Washington, and Pittsburgh are not out of the realm of probability in the years ahead, all because of the federal government's super-highway network and the difference in the cost of hauling wheat instead of flour over long distances.

Paul L. Dittemore

The next question is almost an automatic one: What type of mill will be built, and what will be its capacity, if we are to have a relocation of manufacturing facilities? The almost automatic answers are: It will be a pneumatic mill and will employ the impact milling process and air separation or classification to a large extent, if not exclusively. As to its size, the industrial economists have not yet been able to come up with the answer to the question of what size is ideal or optimum. On paper, however, it would not be too difficult a task to arrive at a capacity figure commensurate with a total consumption for the area estimate weighed against a milling company's share of that market.

Automation Is Here

Automation is a word or even a thought that creeps into a miller's dreams and even his conversation occasionally. Automation in industry is past the theory or dream stage. Automation is here and any miller who is ready and willing to pay the price can have an automated mill. All that would be necessary would be a card or punched tape containing the right number of perforations in the right places. The information on the tape or punched card will then set dials, open valves, start machines, etc., all down the line. One has only to look at what has been accomplished with automation in the automotive, steel, glass, electrical manufacturing and other industries to reach the conclusion that this form of engineering wizardy can be applied successfully to the flour milling industry. Repeating: Automation is here and any miller who is ready and willing to pay the price can have an automated mill.

Role of Impact Mills

With regard to the role of impact mills in the mill of the future, it appears that research has demonstrated the physical differences in particles

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reduced by impact and differential rollers. Years ago, Dr. C. O. Swanson of Kansas State College advanced what then was a theory about the structure of the wheat kernel. He described it as a "gluten mesh" . . . where the protein fraction of a wheat kernel was to be compared to the beeswax in a comb of honey, with the starch fraction occupying the cells.

The physical action of closely spaced differential speed roller mills apparently has a tendency to squeeze and flake, whereas the impact mill breaks the endosperm-and-protein mass. The starch granule is tougher or more resilient than the proteinaceous gridwork and will withstand the impact of Entoleter's 40-inch "CentriMil" while the protein literally "can't take it," and disintegrates. The smaller particles constitute the high protein fraction, analyzing 25 to 35% protein while the larger starch particles have a substantially reduced protein content. The best cut-point on the basis of present knowledge appears to be in the vicinity of 8 to 10 microns.

Separation is attained by air rather than sifter use because the particles produced (and desired) are in the sub-sieve range of less than 80 microns, the upper limit for 16XX bolting media. Research in cereal chemistry has demonstrated conclusively that there is a high and positive relationship between the particle size of flour and the quality of the bread or other baked goods produced from that flour. This was reported extensively in a series of articles by F. H. Wichser and Dr. J. A. Shellenberger of Kansas State College several years ago. The cereal chemist's explanation of the superior performance of flours having a small particle size is that the smaller particles expose a greater total surface area to the action of enzymes, yeasts and other reactors in the baking process.

Air Separation Research

Research work in air separation has been increased with the interest of the Sharples Corp. of Philadelphia in the application of its "Super Classifier" to the flour milling industry's classification problems. Not all of the answers are known, of course, but neither were all of the answers known when pneumatic conveying was first applied to flour mills. The engineers have the pneumatic conveying problem pretty well conquered at this time, though, and it is reasonable to anticipate the solution to the many mathematical and physical problems associated with classification by air of flour in the sub-sieve range.

The air classifier will not eliminate the need for purifiers and sifters. The preliminary classification by particle size and the removal of bran from the stock will continue to be essential. The sifter, however, will be delivering in-process products instead of finished flour.

It has been predicted that flour deliveries to bakeries in the future will be on a bulk delivery, "keep filled" system and that with existing scale meters and fluidizing devices, it is possible to equip a bulk truck to deliver a quantity of flour and supply the baker with a meter-imprinted ticket showing the weight of the flour delivered, the date of delivery, etc. This would eliminate the need for the baker to rebuild his shop to accommodate storage tanks that could accept a full bulk rail car of flour at one time.

The flour milling industry, then, can continue its progress by keeping abreast of new developments in other industries as well as by applying the time and talents of its own technologists. One does not need a crystal ball or even an ouija board to predict that the milling industry will experience in the years ahead many changes which today may be tabbed as revolutionary, but the chances are that they won't seem to deserve that adjective when they do come.

Italians Publish Technical Book

Tecnia Molitoria, the Italian milling technical publication, has published a technical manual for the milling industry titled Manuale Tecnico Del Mugnaio, by G. Mozzone.

The book, 287 pages in length, starts with a preliminary treatise of wheat and its characteristics. Half of the book is devoted to the principles of cleaning, aspiration, grinding, break systems, classification of semolinas and flour proportions. Laboratory tests are described in detail. Included are pictures of mill buildings, installations and machines, most of them the products of Italian firms.

Mr. Mozzone details his ideas on building a mill, selecting the colors in plants, salaries as they rate for achieving efficiency, management and personnel problems, lubrication and pneumatic conveying.

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ELEVATOR LOSS SET

NEW PARIS, OHIO—The loss of the Reigel Feed & Grain Elevator at New Paris, which was destroyed by fire March 4, has been estimated at $75,000.

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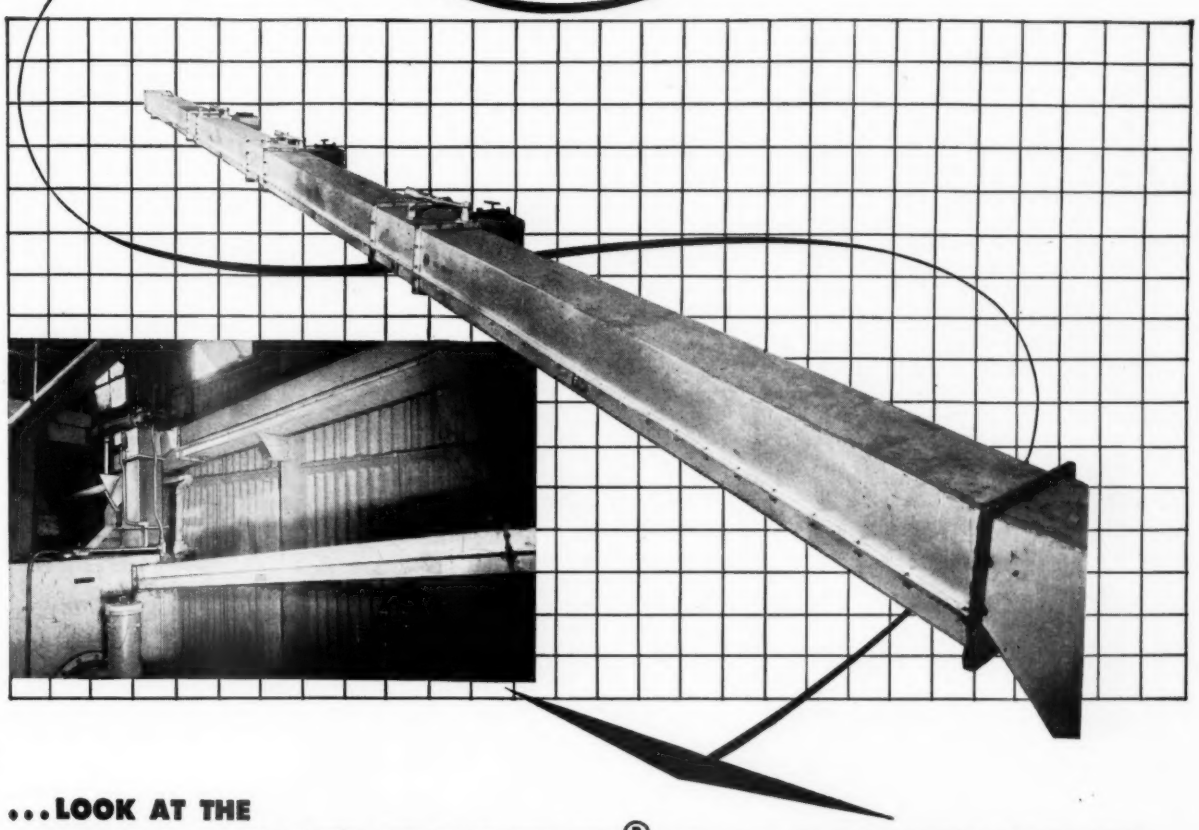

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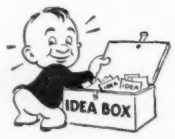


New Products
New Services
New Literature

This reader service department announces the development of new and improved products, new services and new literature offered by manufacturers and suppliers. Claims made in this department are those of the firm concerned. Use the accompanying coupon to obtain the desired information.

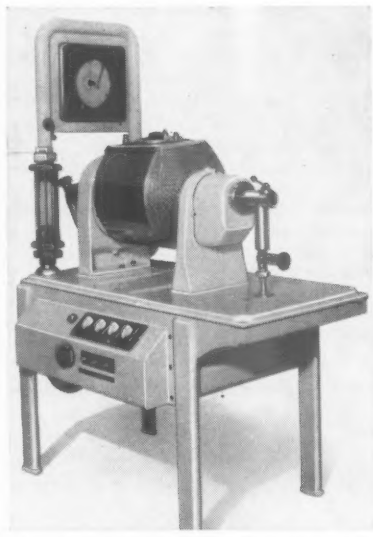
No. 4069—Filling Tube

The Atkinson Bulk Transport Co. has developed a device to fill bulk bins to maximum capacity. It consists of a tube running the length of the container (bin or truck). The tube is of the same diameter as the pipe or hose leading to the bin or truck. Successive openings load the

container to even above the level of the tube. About 15% more flour can be placed in the bin space with this device than is possible with conventional gravity loading, company officials claim. The loading tube has been in use since Atkinson placed its first bulk flour truck in service in January, 1953. It is standard on all Fruehauf-built bulk flour trucks now in use that are equipped with the company's "Bulk King" patented system. Stationary interior bins of horizontal design also use the tube for maximum filling, it is pointed out by the spokesmen for the company. Check No. 4069 on the coupon, clip and mail it to secure complete details.

No. 4076—Laboratory Conditioner

MIAG Northamerica, Inc., has redesigned its laboratory conditioner for conditioning of wheat samples (6-17 lb.) which enables the miller and cereal chemist to predetermine an optimum conditioning schedule. The conditioner is said to allow the application of the variable factors, temperature, time and moisture as well as vacuum. A rotating drum containing the wheat sample has electrically heated walls. The sample can also be heated and moistened by steam injection. Drum temperature and steam quantity can be adjusted.



Air of varying temperature and volume can be introduced into the drum for drying purposes. The drum is built vacuum-tight allowing treatment under vacuum as well as under normal atmospheric pressure. Systematic test series can be conducted as to establish the most suitable conditioning pattern for different wheat varieties. Conditioning is aiming at improving of endosperm structure, easing of separation of bran from endosperm, adjustment of uniform moisture content and moisture distribution within the wheat berry. Grain other than wheat and various other granular non-sticky food and chemical products can also be tested, according to company officials. Secure complete details by checking No. 4076 on the coupon and mailing it to this publication.

No. 4075—Rail Car Loading Device

An airtight, lightweight, weatherproof railroad car bulk material loading cap has been developed and patented by the Atkinson Bulk Transport Co. An elbow tube projects through the hatch cover and by easy manual turning directs the flour to

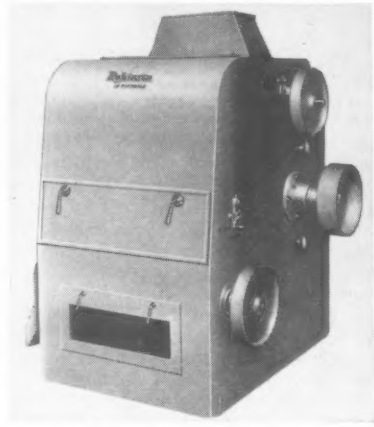
all parts of the car for maximum load. Company officials said that, "Having been used by Atkinson since June, 1954, it has been found the ideal, sanitary and efficient railroad car connection. It works equally well for pneumatic or fluidized loading." Secure complete details by checking No. 4075 on the coupon and mailing it to this publication.

No. 4078—V-Belt Bulletin

Precautions to prolong the life of V-belts, increase drive efficiency and thereby assure full continuous production are contained in a new 12-page bulletin released by the Allis-Chalmers Manufacturing Co. The bulletin describes various types of V-belts and tells how to select and match them. It lists seven steps for the correct installation of belts and offers as many hints for making them last longer. Portrayed are eight most common causes of V-belt destruction. These include snub break, slip burn, base cracking, abrasion, oil deterioration, rupture, ply separation and worn sides. Information in the bulletin is applicable to all types of V-belts manufactured today. Secure the booklet by checking No. 4078 on the coupon and mailing it.

No. 4077—Cleaning Machine, Brush

The Robinson Lord Brush type KBm is the trade name of a new unit designed as a cleaning machine in the screenroom and as a final brush immediately before the first break, announces the manufacturer, Thomas Robinson & Son, Ltd. Features claimed in literature available to those interested are: "Far smaller than any other machine with a comparable performance; sensitive feed gate adjustment provides an even delivery and ensures treatment for the entire surface of every grain; thorough 'brush to brush' action easily adjusted while the machine is in operation; the machine may be 'set-up' to its work according to the visual evidence of the degree of treatment the grain is receiving; provides a double aspiration covering the whole feeding and brushing process, enabling the most searching aspiration by 'free air' to be made, thereby removing unseparated screening, liberated beard, beeswing and dust particle." Secure complete details by checking No. 4077 on the coupon and mailing it to this publication.



No. 4073—Lubrication Fitting

A new relief-type lubrication fitting is available for use on antifriction bearings in motors, machinery, pillow blocks or any ball or roller bearing housing equipped with conventional relief plugs. The fitting, manufactured by the Keystone Lubricating Co., features a patented, "flip-open" cap that speeds bearing lubrication. The body of the fitting is internally flared to allow free discharge of excess grease. An 80% cut in lubricating time is claimed. Secure complete details by checking No. 4073 on the coupon and mailing it.

No. 4074—Unbridging Bins

The Sonic Flo is the trade name for a device manufactured by the JCL Engineering Co. for unbridging materials with steel, concrete and wood

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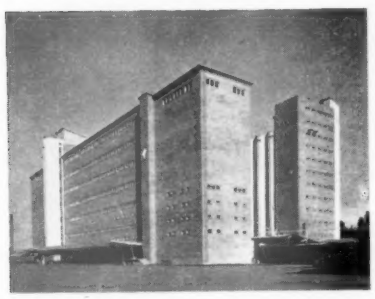

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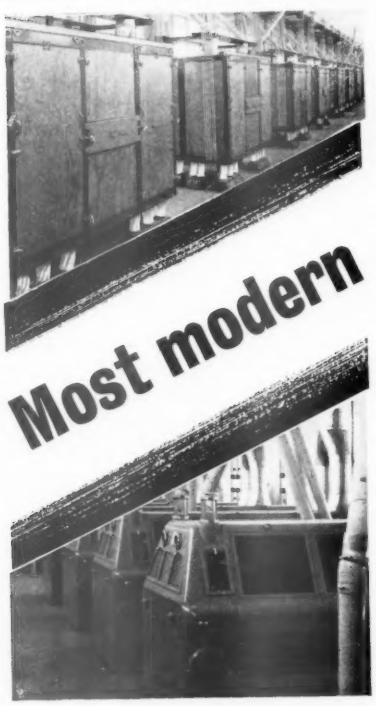

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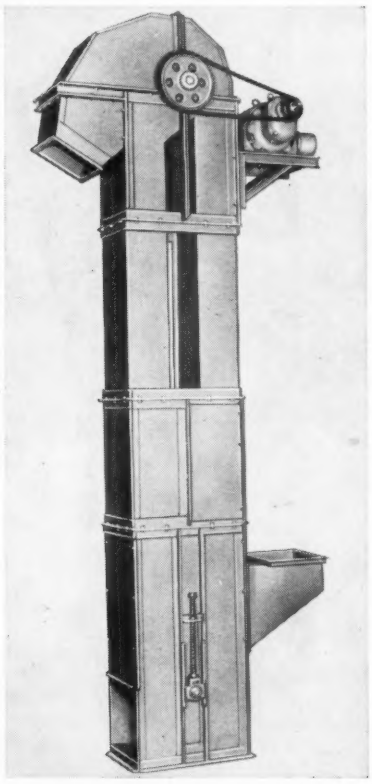
bins. It is in use for unbridging bins containing millrun, ground oats, corn germ and many other materials. The device "has been engineered and designed to specifically vibrate (by sonic waves) each individual particle of material, causing it to break loose," according to the company. The unit can be made portable or a permanent part of the bin and when provided with accessories can be made automatic. It is air operated. Secure complete details by checking No. 4074 on the coupon and mailing it to the address provided.

No. 5674—Bucket Elevator

The Universal Hoist Company's new model "D" bucket elevator is designed for all dry, free-flowing materials, with capacities from 1,000-3,000 bu. per hour. Three different drives are available in all horsepower ranges as well as 2-way or 3-way valves, 6-way distributors and other



accessories. New catalogs with prices and complete specifications are available without obligation. Check No. 5674 on the coupon and mail it to this publication.

No. 4070—Belt-Type Feeder

A belt-type gravimetric feeder, called by the trade name, Hi-Weigh model 37-20, has been developed by the Omega Machine Co., a division of B-I-F Industries, Inc. The feeder, according to a new color, four-page bulletin, is a "durable, medium to high capacity dry material feeder." Sections describe the advantages, principles of operation and Sens-A-Gram mechanical controller of the feeder. Dimensional and performance specifications are also given. It is designed to feed more than 3,000 lb. per minute. Check No. 4070 on the coupon and mail it to secure the bulletin.

No. 4071—Bulk Handling Bulletin

Sprout, Waldron & Co., Inc. has announced bulletin 149 which is a compilation of case histories of many of its materials handling installations in the flour and feed field. This new bulletin has, for example, a study of a new installation in one of central Pennsylvania's bakeries and also includes installation photographs and information about Pneu-Vac equipment in many other grain and feedstuff installations. For a copy of the bulletin check No. 4071 on the coupon and mail it.

No. 4072—Speed Reducers

A new illustrated, 8-page brochure has been prepared to show the line of speed reducers produced by the Strong-Scott Manufacturing Co. The reducers are said to be ideal for speed reduction of ½ to 50 h.p. motors, on equipment such as elevator legs, conveyors and many other types of machinery. Stocks are now available. Check No. 4072 on the coupon and mail it to secure the brochure.

No. 4079—Pneumatic Conveying Literature

A brochure entitled, "Hoffco-veyer Systems," has been issued by the U. S. Hoffman Machinery Corp. to describe its systems for pneumatic conveying of dry, free-flowing materials. The 8-page brochure details the reasons for installing a Hoffco-veyer system, the basic types available, successful installations in operation and a complete run-down on the details of installation and possible applications. The brochure is No. PN-500. Check No. 4079 on the coupon and mail it to secure the brochure.

Also Available

The following new products have been described in previous issues and information about them may still be obtained by jotting the appropriate number on the coupon and forwarding it to this magazine.

No. 3856—Toppings and fillings, Max Ams Co.

No. 3857—Edible oil filter, Industrial Filtration Co.

No. 3858 — Automatic doughnut making, Doughnut Corporation of America.

No. 3859 — Teflon tape, United States Gasket Co.

No. 3860—Utilities cost booklet, Rateonics Corp.

No. 3861—Banana baking recipes, Banamash division of the Catz American Co., Inc.

No. 3862—Pan Service, Chicago Metallic Manufacturing Co.

No. 3863—Film sealer, Cleveland Heat Sealing Equipment Manufacturing Co.

No. 3864—Bakery fixtures, Maine Manufacturing Co.

No. 3865—Depanning service, Mallet & Co., Inc.

No. 3866 — Electronic controls, Fielden Instrument division, Robertshaw-Fulton Controls Co.

No. 4056—Bulk flour weigher, Toledo Scale Co.

No. 4059—Self-powered feeder, 200-2,000 lb. per minute, Wallace & Tiernan Inc.

No. 4060—Motor selector guide, Reliance Electric & Engineering Co.

No. 4061—Nylon breather unit for venting Airslide cars and other bulk flour transports, Fuller Co.

No. 4062 — Single roll crusher, Sprout, Waldron & Co., Inc.

No. 4063—Research bulletin, Allis-Chalmers Manufacturing Co.

No. 4064—Wire screen folder, Cleveland Wire Cloth & Manufacturing Co.

No. 5502—Sprays and spray concentrates for grain protection, Larvacide Products, Inc.

No. 5561—Attrition mill, Strong-Scott Manufacturing Co.

No. 5596—Fire detection system, Seedburo Equipment Co.

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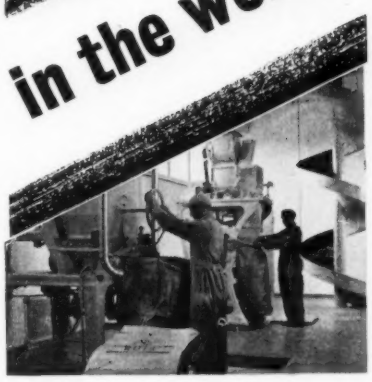

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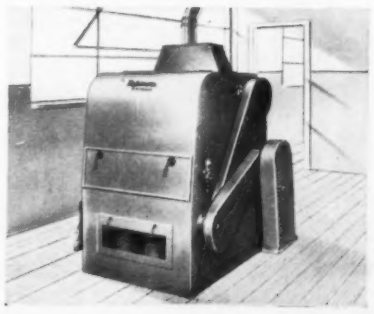

Sample location and number	Concentration per 1000 cu. ft. after 2 hours	6 hours	24 hours	Mortality of test insects
	Ounces	Ounces	Ounces	Percent
Headspace				
1. Above load	.4	.4	.2	
1 foot deep				
2. Quadrant A	.7	.3	.2	
3. Quadrant B	.6	.4	.2	
4. Quadrant C	.7	.4	.2	
5. Quadrant D	.5	.4	.2	
6. Center	.5	.4	.2	
6 feet deep				
7. Quadrant A	.3	.2	.2	100
8. Quadrant B	.6	.4	.2	
9. Quadrant C	.2	.3	.1	
10. Quadrant D	.3	.3	.2	100
11. Center	.3	.3	T	100
12 feet deep				
12. Quadrant A	.3	.1	T	
13. Quadrant B	.3	.1	.2	
14. Quadrant C	.2	.1	T	
15. Quadrant D	.3	.3	.2	100
16. Center	.2	.1	T	
18 feet deep				
17. Quadrant A	.2	T	0	100
18. Quadrant B	.6	.5	T	
19. Quadrant C	.1	.1	T	
20. Quadrant D	.2	.2	.1	93
21. Center	T	0	T	100
24 feet deep				
22. Quadrant A	.3	T	0	100
23. Quadrant B	T	T	T	
24. Quadrant C	T	T	T	
25. Quadrant D	.1	.1	.1	80
26. Center	T	.1	T	33

TABLE 1—Distribution of HCN and the mortality of test insects in tank A, resulting from recirculation for one hour with an air flow rate of 0.12 c.f.m./bu. with a dosage rate of ½ lb. 1,000 cu. ft.

Sample location and number	Concentration per 1000 cu. ft. after 2 hours	6 hours	24 hours	Mortality of test insects
	Ounces	Ounces	Ounces	Percent
Headspace				
1. Above load	7	6	4	
1 foot deep				
2. Quadrant A	7	5	4	
3. Quadrant B	5	4	2	
4. Quadrant C	7	5	4	
5. Quadrant D	8	6	3	
6. Center	6	2	1	
6 feet deep				
7. Quadrant A	3	2	2	100
8. Quadrant B	0	T	0	
9. Quadrant C	1	1	1	100
10. Quadrant D	9	7	4	
11. Center	1	1	T	100
12 feet deep				
12. Quadrant A	1	T	T	100
13. Quadrant B	0	T	0	
14. Quadrant C	8	7	0	100
15. Quadrant D	9	6	4	
16. Center	0	0	0	
18 feet deep				
17. Quadrant A	T	0	0	33
18. Quadrant B	0	0	0	
19. Quadrant C	8	7	6	20
20. Quadrant D	5	7	4	
21. Center	0	0	0	
24 feet deep				
22. Quadrant A	T	0	0	0
23. Quadrant B	0	0	0	
24. Quadrant C	9	7	4	100
25. Quadrant D	1	T	0	
26. Center	0	0	0	

TABLE 2—Distribution of HCN and the mortality of test insects in tank B, resulting from recirculation for one hour with an air flow rate of 0.04 c.f.m./bu. with a dosage rate of 1 lb. 1,000 cu. ft.

HCN IN BULK GRAIN

(Continued from page 26a)

The samples were analyzed by representatives of American Cyanamid Co. The gas was drawn at a known rate, as measured by a rotometer, through a small scrubber containing 15 ml. of a 2% sodium hydroxide solution. A few drops of a 2% potassium iodide solution were added and the sample titrated with silver nitrate. This technique was not as rapid as when a gas analyzer unit was used, and the sampling periods were changed from the usual pattern of one-half, two, four, eight and 24 hours.

Test insects were placed at gas sampling locations at stations A, D, and at the center, as indicated in tables 1 and 2, by using probes that were equipped with an insect cage in the tip, and a hollow shaft which drew a gas sample from directly behind the insect cage. Adult rice weevils were used as the test insects. The probes were removed after an aeration period of approximately 2½ hours, and mortality counts were made immediately.

At the start of each test, after the gas sampling and insect probes were in place, the blowers were started and the introduction of gas was begun. The gas was sprayed into the overspace with a pressure of 175 p.s.i. in the supply tanks. The supply tanks were connected to the outlet nozzles by copper tubing. In tank A, six high-pressure HCN nozzles were used, in tank B, 12 nozzles, spaced more or less equidistant in the overspace. In each test about one hour was required to introduce the selected dosage. The air-gas mixture was recirculated for one hour after all of the gas was introduced.

In tank A, a dosage rate of ½ lb./1,000 cu. ft. was applied, in tank B a rate of 1 lb./1,000 cu. ft. At the end of the 24-hour exposure period, vents were opened on the return ducts and the gas was exhausted by operating the aeration system. After approximately 2½ hours, the insect probes were removed.

Results of Tests

The results of the test in tank A are presented in table 1. The distribution was fairly even in the upper half of the load, but it was weak at the 18 and 24-foot depths at all stations. This was reflected in the kill obtained of test insects at the 18 and 24-foot depths in quadrant D, and at the 24-foot depth at the center.

The results of the test in tank B are presented in table 2. The concentrations in the overspace and in the upper part of the tank reflected the increased dosage rate. The distri-

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bution was good from top to bottom on quadrant C, and good to the 18-foot depth in quadrant D. Quadrant B and the center reflect the imbalance of airflow due to the collapsed laterals in those areas.

It was concluded from these exploratory tests that distribution of HCN in bulk grain can be accomplished by modifications of existing aeration systems just as readily as with other fumigants. It was deduced that more rapid introduction of the gas would promote better distribution, since in nearly all instances the concentrations tapered off in relation to the depth in the grain.

——BREAD IS THE STAFF OF LIFE——

Experiments in Bran Separation Aided By USDA Grant

MANHATTAN, KANSAS — Research to find better methods of separating wheat bran from the endosperm will be continued at Kansas State College with a new $35,000 grant from the U.S. Department of Agriculture, according to J. A. Shellenberger, head of K-State's department of flour and feed milling industries.

The work has been underway for about a year, with Gordon M. Grosh devoting full time to the agricultural experiment station project. The grant is from the engineering division of the northern utilization branch, USDA laboratory, Peoria, Ill.

Mr. Grosh has been working on three techniques to remove wheat bran prior to milling: 1. By scouring or peeling the outer coating from the wheat; 2. By pearling or rubbing the wheat against an abrasive material to remove the outer coating, and, 3. By impact or hurling the wheat kernel at high velocity against surfaces to break off the seed coat. While these techniques have all been tried before, there has been little scientific study in this area.

Mr. Grosh is conducting another series of studies to determine how moisture, steam and heat can best be used to help remove the outer coating. A new experimental wheat conditioner which adds steam, heat or water to laboratory samples has been obtained for use in these studies from the milling machinery firm, MIAG.

Another series of studies involves separating material by means of an air centrifugal classifier and a high speed impactor. The centrifugal classifier operates on the principle of the cream separator. The impactor is run at high velocities to disintegrate the wheat.

Purpose of the experiments is to obtain more flour from wheat with less cost, less power, and a minimum of feed by-products.

——BREAD IS THE STAFF OF LIFE——

Texas City Firm Reorganized Under Coronet Operation

NORFOLK, VA.—Approval of the reorganization of Texas City Chemicals, Inc., manufacturer of dicalcium phosphate and sulphuric and phosphoric acid, under the management of the Coronet Phosphate Co., division of Smith-Douglass Co., has been announced. Confirmation of the plan of reorganization was entered in the U.S. District Court for the southern district of Texas.

As reorganized, the parent Smith-Douglass Co. becomes the sole stockholder of Texas City Chemicals, Inc., which will be operated as a separate corporation, under the management of Coronet Phosphate division.

The action places Coronet in both the dicalcium and defluorinated phosphate markets and simultaneously makes it one of the leading suppliers of phosphorus to the feed trade. Distribution advantages of Texas City production to feed manufacturers in the Souhwest, Midwest and on the West Coast were stressed in a company announcement.

Texas City Chemicals completed a large dicalcium phosphate plant in 1953. The plant ceased operation in January, 1956.

Smith-Douglass said that it is anticipated that fertilizers and diversified chemicals will be produced at the Texas City plant.

♥ ♥

J. Paul Smith Co. Named Coronet Agent

FT. WORTH, TEXAS—The J. Paul Smith Co., Ft. Worth, Texas, has been appointed sales agent for the Coronet Phosphate Company's product, Coronet Dikal, for Texas, Oklahoma, Arkansas, Louisiana and New Mexico, announces Henry Highton, Coronet sales manager.

Facilities of Texas City Chemicals, Inc., now under management of the Coronet Phosphate Co., will produce "a uniform 19% phosphorus dicalcium phosphate product," according to company spokesmen.

The J. Paul Smth Co. has acquired a fleet of trucks for the convenience of feed manufacturers who want less than carload deliveries in the five-state area. The Smith company has been a supplier of feed ingredients for a number of years.

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TO SAVE THE GRAIN THAT FEEDS THE NATION

Scientists to Visit Oklahoma A&M

STILLWATER, OKLA. — Twenty scientists from western European countries will gather at Oklahoma A&M College April 15-19 for a five-day school on atomic energy in agriculture.

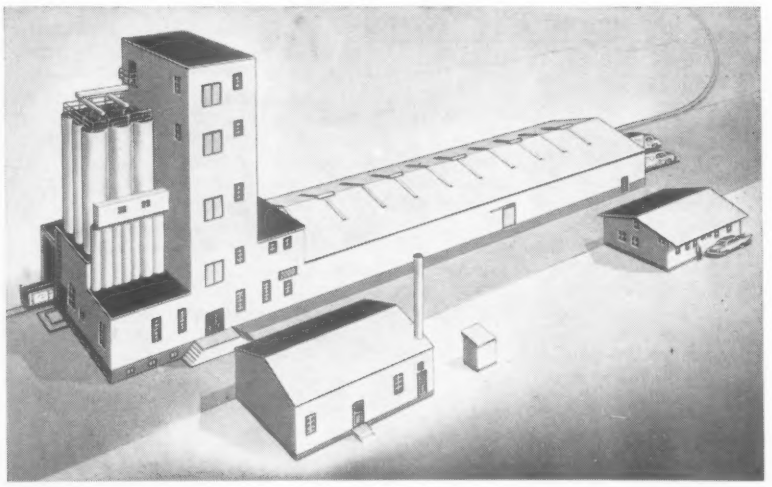
The group of top scientists from Austria, Denmark, Germany, Greece, Italy, Netherlands, Iceland and Portugal is the first delegation to come to the U.S. to study the use of radioisotopes in agriculture.

During their visit at A&M, the scientists will spend considerable time in the radioisotopes and radiations laboratory, and they will hear extensive research discussions on the role of the atom in agriculture. Their visit to the U.S. is being sponsored by the International Cooperation Administration.

—BREAD IS THE STAFF OF LIFE—

FIRM CLOSES OFFICE

SAN FRANCISCO—The Northwest Flour Co., flour and grain dealer, has closed its San Francisco office, formerly located at 594 Clay street. Robert Maini was San Francisco representative.



NEW HUBBARD PLANT—This is an artist's drawing of the new Hubbard Milling Co. plant due for completion early this summer in Cedar Rapids, Iowa. The T. E. Ibberson Co., Minneapolis, is constructing the feed mill. Modern equipment will weigh each ingredient before it goes into the batch mix, and steel storage bins will provide handling of finished feeds or concentrates for rail or truck shipment. A 50 by 220 ft. warehouse will be the first section completed. The new plant will be served by the Cedar Rapids and Iowa City railroad.

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PURIFIER TEST

(Continued from page 20a)

purifier performance by predetermined settings and standard sampling procedures.

5. SAMPLING.

Obtain representative samples and weigh up each of the following streams two minutes or more:

(a) Incoming stock to purifier.
(b) First cut.
(c) Second cut.
(d) Third cut.
(e) Any other throughs or cuts.
(f) Sieve tailovers.
(g) Tailings from tins and settling chambers, etc.
(h) Purifier dust collector stock if a separate dust collector is used for the air from the purifier.

6. EVALUATION.

1. Compute flow rate of each stock classification in lbs/hour and percent of all classifications.

2. Determine the granulation of the incoming stock on a test sifter (select proper sieve range).

3. Determine moisture and ash of each sample. Visual comparison of the samples sshould be made.

4. Plot a cumulative ash curve for each test (on 14% moisture basis).

7. FORMS TO USE.

A recommended report sheet accompanies this report.

Donald S. Eber
Secretary, AOM . . .

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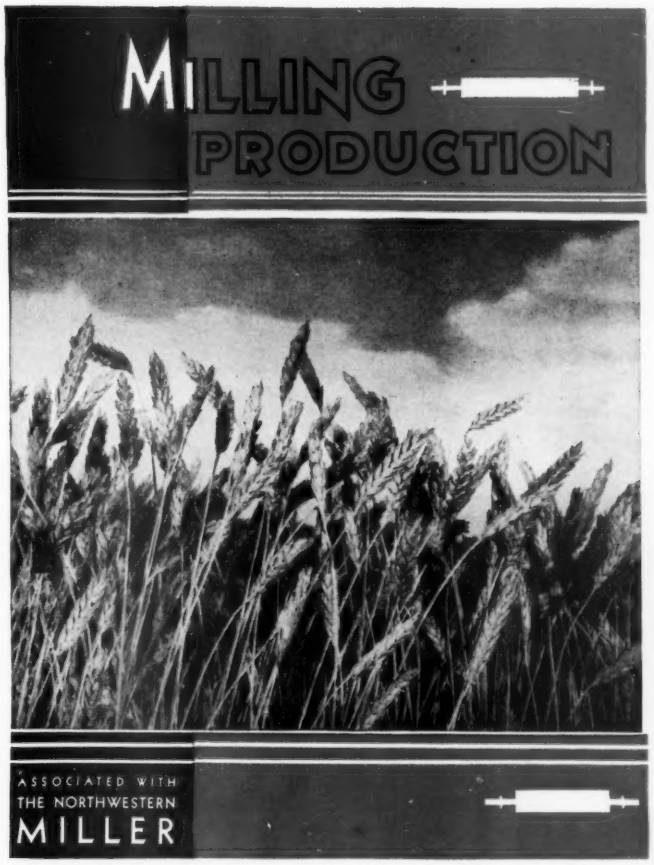

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